

CURRICULUM VITA OF Dr. RACHID TOUZANI

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ORGANIC, ORGANOMETALLIC AND ANALYTICAL CHEMISTRY

A highly motivated and ambitious person. Fluent in English, French and Arabic. Noted for being People-oriented and results driven with strong interpersonal, communication and organizational skills. At ease working in a team environment or independently. Enjoy being challenged and motivated to find solutions to chemistry's problems such as the environment, energy, materials, catalysis, and drug discovery.

He has approximately twenty-three years of research experience in organic synthesis especially in the area of heterocyclic chemistry (pyrazole, triazole, pyridine, imidazole and quinoxaline), organometallic catalysis (Cu, Pd, Rh and Ru), oxidation reactions of catechol, inhibition of corrosion in acidic media, elimination and detection of hazardous molecules, dendrimers, and synthetic and natural bioactive products. In 2010 he wins Fulbright fellowship us visiting scholar in Rutgers University USA. He has been also Invited as Member in MENA delegation for participation in PITTCOM 2010, Orlando-Florida USA. He has supervised more than 20 PhD and master students. He has been selected for research excellence award in 2018, University Mohammed Premier, Morocco. He developed and participate in many national and international research projects. He has developed and has built many international collaborations.

EDUCATION AND EXPERIENCE

2015- present: Full Professor, University Mohammed Premier, Oujda- Morocco

- Synthesis, characterisations and applications of organic heterocyclic compounds
- Elaboration, development and scale-up of organic syntheses
- Synthesis of bioactive molecules
- Experience with sensitive organometallic compounds
- Use of instruments such as GC, IR, NMR, UV, and robot for parallel synthesis
- Experience with homogenous and heterogeneous catalyst
- Experience with combinatorial chemistry
- Experience with dendrimers and their applications
- Experience with Sensors for pollutants gas
- Naturel products: aromatic and medicinal plants

2009-2015: Associate Professor University Mohammed Premier, Faculty Pluridisciplinary of Nador, Morocco

- Combinatorial Chemistry
- Dendrimers
- Catalyse
- Green Chemistry
- Nitrogen Heterocyclic Compounds Synthesis
- Naturel products: aromatic and medicinal plants

2005- 2009: Assistant Professor; University Mohammed Premier, Faculty Pluridisciplinary of Nador, Morocco

- General Organic Chemistry.
- Responsible for course and TA in General Organic Chemistry.
- Biochemistry.
- Oxidation Catalysis Reaction.
- Heterocyclic Synthesis and Their Applications.

2003-2005: Postdoctoral position in Ottawa University, Ontario Canada, (Dendrimers)

- Synthesis of environment supported catalyst on silica dendrimers.
- Carbonylation reaction of allyl compounds and synthesis of new heterocyclic compounds with the improvement of the yields and the recyclability of the catalyst.
- Hydroformylation reactions.
- Manager in research laboratory for one year.

2001-2002: Postdoctoral position in Rennes1 University, France (Combinatorial Chemistry)

- Development of an efficient access, fast and simple purification techniques to tripodal compounds with the opportunity to easily change one, two, or all three of the building blocks.
- Parallel synthesis with a High Throughput method using either plate or robotics for the synthesis of heterocyclic libraries.
- Performing a combinatorial catalysis approach for the activation of diolefinc derivative, while showing the impact of the TLC screening test for detection of unexpected catalytic activity.

1998-2001: National Doctorate (PhD) in Organic, Organometallic and Analytical Chemistry, University Mohammed Premier, Oujda, Morocco

Synthesis of variety of Nitrogen compounds and their biological activity studies (antifungicidit, anticancer, and antituberculosis action and interaction with DNA)

- Synthesis of new nitrogen ligands, under microwave irradiation in the absence of solvent, which offers numerous advantages, such as reducing the reaction time, improvement the yields, and simplifying the experimental procedure.
- Synthesis of variety of bifunctionalized quinoxaline, which possess strong intramolecular NH---O bonds may be responsible for the biological activity studies (antifungicidit, anticancer, and antituberculosis action and interaction with DNA).
- Preparation of ruthenium (II) organometallic complexes.
- Successful collaboration with Prof. Pierre H. Dixneuf, Institute of Chemistry of Rennes, France. Participated in three training sessions over a two-year period for metal complex synthesis and olefin metathesis application.

1997: C.E.A (MSc) of Organic Chemistry, University Mohammed IV, Rabat, Morocco

Synthesis of new heterocyclic compounds such as benzodiazepine and benzimidazole.

SCIENTIFIC PRODUCTION

Publications by applications (more than 230 documents)

1) Inhibition of the corrosion properties

1. N Mechbal, ME Belghiti, N Benzbiria, CH Lai, Y Kaddouri, Y Karzazi, ... Correlation between corrosion inhibition efficiency in sulfuric acid medium and the molecular structures of two newly eco-friendly pyrazole derivatives on iron oxide surface, *Journal of Molecular Liquids* 331 (2021)115656.
2. A El Hattak, S Izzaouihda, Z Rouifi, F Benhiba, S Tabti, A Djedouani, ... Anti-corrosion performance of pyran-2-one derivatives for mild steel in acidic medium: Electrochemical and theoretical study, *Chemical Data Collections* 32 (2021) 100655.
3. Y El Ouadi, M Lamsayah, H Bendaif, F Benhiba, R Touzani, I Warad, ..., Electrochemical and theoretical considerations for interfacial adsorption of novel long chain acid pyrazole for mild steel conservation in 1 M HCl medium, *Chemical Data Collections* 31 (2021) 100638.
4. A Benzai, F Derridj, O Mouadili, M El Azzouzi, M Kaddouri, K Cherrak, ..., Anti-Corrosive Properties and Quantum Chemical Studies of (Benzoxazol) Derivatives on Mild Steel in HCl (1 M), *Portugaliae Electrochimica Acta* 39 (2) (2021) 135-153.
5. Arrousse, N., Salim, R., Kaddouri, Y., Touzani, R., Taleb, M., Jodeh, S.; The inhibition behavior of two pyrimidine-pyrazole derivatives against corrosion in hydrochloric solution: Experimental, surface analysis and in silico approach studies; *Arabian Journal of Chemistry*; 13(7), (2020) 5949-5965.
6. Bouklah, M., Daoudi, W., Hammouti, B., Touzani, R., Radi, S., Ramdani, M., Bouyanzer, A., Aouniti, A., Salghi, R., Inhibitor adsorption processes in mild steel/new bipyrazole derivatives/hydrochloric acid system, *Materials Today: Proceedings*; 27 (4) (2020) 3209-3216.
7. Khatabi, M., Benhiba, F., Tabti, S., Touzani, R., Oudda, H., Zarrouk, A.; Performance and computational studies of two soluble pyran derivatives as corrosion inhibitors for mild steel in HCl; *Journal of Molecular Structure*; 1196, (2019) 231-244.
8. Guerraf, A.E., Titi, A., Cherrak, K., (...), Touzani, R., Hammouti, B., Lgaz, H.; The Synergistic Effect of Chloride Ion and 1,5-Diaminonaphthalene on the Corrosion Inhibition of Mild Steel in 0.5 M Sulfuric Acid: Experimental and Theoretical Insights.; *Surfaces and Interfaces*; 13 (2018)168-177.
9. Titi, A., Mechbal, N., El Guerraf, A., (...), Touzani, R., Chung, I.-M., Lgaz, H.; Experimental and Theoretical Studies on Inhibition of Carbon Steel Corrosion by 1,5-Diaminonaphthalene; *Journal of Bio- and Triboro-Corrosion*; 4(2) (2018) 22.
10. Louadi, Y.E., Abrigach, F., Bouyanzer, A., (...), Touzani, R., Zarrouk, A., Hammouti, B.; Theoretical and experimental studies on the corrosion inhibition potentials of two tetrakis

pyrazole derivatives for mild steel in 1.0 M HCl; *Portugaliae Electrochimica Acta*; 35(3)(2017)159-178.

- 11.Kaddouri, Y., Takfaoui, A., Abrigach, F., (...), Touzani, R., Sdassi, H.; Tridentate pyrazole ligands: Synthesis, characterization and corrosion inhibition properties with theoretical investigations; *Journal of Materials and Environmental Science*; 8(3), (2017) 845-856.
- 12.Bousskri, A., Anejjar, A., Salghi, R., (...), Touzani, R., Bazzi, L., Lgaz, H.; Corrosion control of carbon steel in hydrochloric acid by new eco-friendly picolinium-based ionic liquids derivative: Electrochemical and synergistic studies; *Journal of Materials and Environmental Science*; 7(11) (2016) 4269-4289.
- 13.El Arrouji, S., Ismaily Alaoui, K., Zerrouki, A., (...), Touzani, R., Chetouani, A., Aouniti, A.; The influence of some pyrazole derivatives on the corrosion behaviour of mild steel in 1M HCl solution; *Journal of Materials and Environmental Science*; 7(1) (2016) 299-309.
- 14.Hmamou, D.B., Salghi, R., Zarrouk, A., (...), Touzani, R., Hammouti, B., El Assyry, A.; Investigation of corrosion inhibition of carbon steel in 0.5 M H₂SO₄ by new bipyrazole derivative using experimental and theoretical approaches; *Journal of Environmental Chemical Engineering*; 3(3) (2015) 2031-2041.
- 15.Zarrouk, A., Assouag, M., Zarrok, H., (...), Touzani, R., Hammouti, B., Bouachrine, M.; Theoretical study of a new group of corrosion inhibitors; *Research Journal of Pharmaceutical, Biological and Chemical Sciences*; 6(4) (2015) 1874-1882.
- 16.El Ouadi, Y., Bouratoua, A., Bouyanzer, A., (...), Touzani, R., Hammouti, B., Chetouani, A.; Effect of Athamanta sicula oil on inhibition of mild steel corrosion in 1M HCl; *Der Pharma Chemica*; 7(2) (2015)103-111.
- 17.Zarrok, H., Assouag, M., Zarrouk, A., (...), Touzani, R., El Hezzat, M., Bouachrine, M.; Quantum chemical study on the corrosion inhibition of some bipyrazoles; *Research Journal of Pharmaceutical, Biological and Chemical Sciences*; 6(4) (2015)1853-1860.
- 18.El Ouadi, Y., Abrigach, F., Bouyanzer, A., (...), Touzani, R., Zarrouk, A., Hammouti, B.; Corrosion inhibition of mild steel by new N-heterocyclic compound in 1 M HCl: Experimental and computational study; *Der Pharma Chemica*; 7(8) (2015) 265-275.
- 19.Ghazoui, A., Tayebi, H., Benchat, N., (...), Guenbour, A., Touzani, R.; 2-(2-hydroxyethyl)-6-phenylpyridazin-3(2H)-one as corrosion inhibitor for mild steel in hydrochloric acid solution; *Der Pharma Chemica*; 6(3) (2014) 6-16.
- 20.Elmsellem, H., Aouniti, A., Khoutoul, M., (...), Touzani, R., Elazzouzi, M.; Theoretical approach to the corrosion inhibition efficiency of some pyrimidine derivatives using DFT method of mild steel in HCl solution; *Journal of Chemical and Pharmaceutical Research*; 6(4) (2014)1216-1224.
- 21.Bouhrira, K., Chetouani, A., Zerouali, D., (...), Yahyaoui, R., Touzani, R.; Theoretical investigation of inhibition of the corrosion of A106 steel in NaCl solution by di-n-butyl bis(thiophene-2-carboxylato-O,O')tin(IV); *Research on Chemical Intermediates*; 40(2), (2014) 569-586

22. Elmsellem, H., Nacer, H., Halaimia, F., (...), Touzani, R., Hammouti, B.; Anti-corrosive properties and quantum chemical study of (E)-4-methoxy-N-(methoxybenzylidene)aniline and (E)-N-(4-methoxybenzylidene)-4-nitroaniline coating on mild steel in molar hydrochloric; International Journal of Electrochemical Science: 9(9) (2014) 5328-5351.
23. Ismaily Alaoui, K., El Hajjaji, F., Azaroual, M.A., (...), Aouniti, A., Touzani, R.; Experimental and quantum chemical studies on corrosion inhibition performance of pyrazolic derivatives for mild steel in hydrochloric acid medium, Correlation between electronic structure and inhibition efficiency; Journal of Chemical and Pharmaceutical Research; 6(7) (2014) 63-81.
24. Zarrok, H., Zarrouk, A., Salghi, R., (...), Touzani, R., Oudda, H.; Corrosion and corrosion inhibition of carbon steel in hydrochloric acid solutions by 2-[bis-(3,5-dimethyl-pyrazol-1-ylmethyl)-amino]-3-hydroxy-butyric acid; Der Pharmacia Lettre; 5(3) (2013) 327-335.
25. El Ouali, I., Chetouani, A., Hammouti, B., (...), Touzani, R., El Kadiri, S., Nladed, S.; Portugaliae Electrochimica Acta ; 31(2)(2013) 53-78.
26. Ghazoui, A., Zarrouk, A., Benchat, N., (...), Touzani, R., Messali, M.; Adsorptive studies of ethyl (3-phenyl-6-thioxopyridazin-1(6h)-yl)acetate as corrosion inhibitors for steel in acidic medium; Physical and Chemical News; 70 (2013) 91-100.
27. Zarrouk, A., Zarrok, H., Salghi, R., (...), Al-Deyab, S.S., Touzani, R.; The adsorption and corrosion inhibition of 2-[Bis-(3,5-dimethyl-pyrazol-1-ylmethyl)-amino]-pentanedioic acid on carbon steel corrosion in 1.0 m HCl; International Journal of Electrochemical Science; 7(10) (2012) 10215-10232.
28. Kaddouri, M., Bouklah, M., Rekkab, S., (...), Touzani, R., Aouniti, A., Kabouche, Z.; Thermodynamic, chemical and electrochemical investigations of calixarene derivatives as corrosion inhibitor for mild steel in hydrochloric acid solution; International Journal of Electrochemical Science; 7(9) (2012) 9004-9023.
29. Rekkab, S., Zarrok, H., Salghi, R., (...), Touzani, R., Zougagh, M.; Green corrosion inhibitor from essential oil of eucalyptus globulus (Myrtaceae) for C38 steel in sulfuric acid solution; Journal of Materials and Environmental Science; 3(4) (2012) 613-627.
30. Bendaha, H., Zarrouk, A., Aouniti, A., (...), Salghi, R., Touzani, R.; Adsorption and corrosion inhibitive properties of some tripodal pyrazolic compounds on mild steel in hydrochloric acid systems; Physical and Chemical News; 64 (2012) 95-103.
31. Hammouti, B., Dafali, A., Touzani, R., Bouachrine, M.; Inhibition of copper corrosion by bipyrazole compound in aerated 3% NaCl; Journal of Saudi Chemical Society; 16(4) (2012) 413-418.
32. Boussalah, N., Ghalem, S., Kadiri, S.E., Hammouti, B., Touzani, R.; Theoretical study of the corrosion inhibition of some bipyrazolic derivatives: A conceptual DFT; investigation; Research on Chemical Intermediates;38(8) (2012) 2009-2023.

- 33.Zarrok, H., Oudda, H., Midaoui, A.E., (...), Radi, S., Touzani, R.; Some new bipyrazole derivatives as corrosion inhibitors for C38 steel in acidic medium; Research on Chemical Intermediates; 38(8) (2012) 2051-2063.
- 34.Zarrouk, A., Zarrok, H., Salghi, R., (...), Touzani, R., Warad, I., Hadda, T.B.; A theoretical investigation on the corrosion inhibition of copper by quinoxaline derivatives in nitric acid solution; International Journal of Electrochemical Science; 7(7) (2012) 6353.
- 35.Zarrouk, A., Hammouti, B., Dafali, A., (...), Touzani, R., Bouachrine, M., Zertoubi, M.; Inhibition of copper corrosion in acid solution by iV-1- naphthylethylenediamine dihydrochloride monomethanolate: Experimental and theoretical study: Part-1; Research on Chemical Intermediates; 38(3-5) (2012) 1079-1089.
- 36.Zarrouk, A., Hammouti, B., Touzani, R., (...), Dafali, A., Elkadir, S. Comparative study of new quinoxaline derivatives towards corrosion of copper in nitric acid; International Journal of Electrochemical Science; 6(10) (2011) 4939-4952.
- 37.Attayibat, A., Touzani, R., Radi, S., (...), Abdelli, I., Ghalem, S. ; Quantum Chemical studies on n-donors based-pyrazole compounds as corrosion inhibitors for steel in acidic media; Asian Journal of Chemistry; 21(1) (2009)105-112.
- 38.Benabdellah, M., Tabji K., Hammouti, B., Touzani, R., Aouniti, A., Dafali, A., El Kadiri, S., The effect of temperature on the corrosion of steel in 1M HCl in the presence of quinoxaline compound. Physical and Chemical News, 43 (2008) 115-120.
- 39.Benabdellah, M., Touzani, R., Aouniti, A., (...), Hammouti, B., Benkaddour, M.; Inhibitive action of some bipyrazolic compounds on the corrosion of steel in 1 M HCl. Part I: Electrochemical study; Materials Chemistry and Physics ; 105(2-3) (2007) 373-379.
- 40.Herrag, L., Hammouti, B., Aouniti, A., Kadiri, S.E., Touzani, R. ; Effect of diaminoalkane derivatives on steel corrosion in HCL media; Acta Chimica Slovenica ; 54(2) (2007) 419-423.
- 41.Benabdellah, M., Touzani, R., Dafali, A., Hammouti, B., El Kadiri, S.; Ruthenium-ligand complex, an efficient inhibitor of steel corrosion in H₃PO₄ media; Materials Letters; 61(4-5), (2007) 1197-1204.
- 42.Ouchrif, A., Zegmout, M., Touzani, R., Hammouti, B., Benkaddour, M., El Kadiri, S., 1-(1,5 dimethyl-1H-pyrazol-3-yl)-butane-1,3-dione as corrosion inhibitor for steel in 0.5M H₂SO₄. Bulletin of Electrochemistry; 23 (2007) 307-311.
- 43.Benabdellah, M., Touzani, R., Aouniti, A., Dafali, A., El Kadiri, S., Hammouti, B., Benkaddour, M., Investigation of the inhibitive effect of some quinoxalines compounds on the corrosion of steel in HCl solutions. Physical and Chemical News, 37 (2007) 63-69.
- 44.El Ouafi, A., Hammouti, B., Oudda, H., (...), Touzani, R., Ramdani, A. ; New bipyrazole derivatives as effective inhibitors for the corrosion of mild steel in 1M HCl medium; Anti-Corrosion Methods and Materials; 49(3) (2002) 199-204.
- 45.Dafali, A., Hammouti, B., Touzani, R., (...), Ramdani, A., el Kacemi, K.E.; Corrosion inhibition of copper in 3 per cent NaCl solution by new bipyrazolic derivatives; Anti-Corrosion Methods and Materials; 49(2) (2002) 96-104.

2) Biological properties

46. Y Kaddouri, F Abrigach, S Ouahhoud, R Benabbes, M El Kodadi, ... Synthesis, characterization, reaction mechanism prediction and biological study of mono, bis and tetrakis pyrazole derivatives against *Fusarium oxysporum* f. sp. *Albedinis* with ... Bioorganic Chemistry 110 (2021) 104696.
47. Y Kaddouri, B Bouchal, F Abrigach, M El Kodadi, M Bellaoui, R Touzani, Synthesis, Molecular Docking, MEP and SAR Analysis, ADME-Tox Predictions, and Antimicrobial Evaluation of Novel Mono-and Tetra-Alkylated Pyrazole and Triazole Ligands, Journal of Chemistry 2021.
48. Ben Hadda, T., Rastija, V., Al Malki, F., Titi, A., Touzani, R., Mabkhot, Y.N., Khalid, S., Zarrouk, A., Siddiqui, B.S., Petra/Osiris/ Molinspiration and Molecular Docking Analyses of 3-Hydroxy-Indolin-2-one Derivatives as Potential Antiviral Agents, Current computer-aided drug design 17 (1) (2021) 123-133.
49. A Titi, SM Almutairi, R Touzani, M Messali, M Tillard, B Hammouti, ... A new mixed pyrazole-diamine/Ni (II) complex, Crystal structure, physicochemical, thermal and antibacterial investigation, Journal of Molecular Structure 1236(2021)130304.
50. AR Bhat, RS Dongre, FA Almalki, M Berredjem, M Aissaoui, R Touzani, ... Synthesis, biological activity and POM/DFT/docking analyses of annulated pyrano [2, 3-d] pyrimidine derivatives: Identification of antibacterial and antitumor pharmacophore sites, Bioorganic Chemistry 106 (2021)104480.
51. Y Kaddouri, F Abrigach, EB Yousfi, B Hammouti, M El Kodadi, A Alsalme, ... New Heterocyclic Compounds: Synthesis, Antioxidant Activity and Computational Insights of Nano-antioxidant as Ascorbate Peroxidase Inhibitor by Various Cyclodextrins as Drug ... Current Drug Delivery (2021).
52. Jalal, M., Hammouti, B., Touzani, R., Aouniti, A., Ozdemir, I., Metal-NHC heterocycle complexes in catalysis and biological applications: Systematic review, Materials Today: Proceedings, online 16 July 2020.
53. Titi, A., Almutairi, S.M., Alrefaei, A.F., Touzani, R., Messali, M., Ali, I.; Novel phenethylimidazolium based ionic liquids: Design, microwave synthesis, in-silico, modeling and biological evaluation studies; Journal of Molecular Liquids; 315(2020)113778.
54. Titi, A., Messali, M., Alqurashy, B.A., Touzani, R., Almalki, F.A., Ben Hadda, T.; Synthesis, characterization, X-Ray crystal study and biotoxicities of pyrazole derivatives: Identification of antitumor, antifungal and antibacterial pharmacophore sites; Journal of Molecular Structure; 1205 (2020)127625.

- 55.Touzani, R., Hammouti, B., Almalki, F.A., Ben Hadda, T., Coronavirus, Covid19, Covid-19 and SARS-CoV-2: A Global Pandemic, A Short Review, *J. Mater. Environ. Sci.*, 11(4) (2020) 736-750.
56. Kaddouri, Y., Abrigach, F., Yousfi, E.B., El Kodadi, M., Touzani, R.; New thiazole, pyridine and pyrazole derivatives as antioxidant candidates: synthesis, DFT calculations and molecular docking study; *Heliyon*; 6(1) (2020) e03185.
- 57.Hadda TB, Rastija V, AlMalki F, Titi A, Touzani R, Mabkhot YN, Khalid S, Petra/Osiris/Molinspiration and Molecular Docking Analyses of 3-Hydroxy-Indolin2-one Derivatives as Potential Antiviral Agents. *Curr Comput Aided Drug Des.*, 16 (2019) 31878861.
- 58.Hammouti, B., Dahmani, M., Yahyi, A., Ettouhami, A., Messali, M., Asehraou, A., Bouyanzer, A., Warad, I., Touzani, R., Black Pepper, the “King of Spices”: Chemical composition to applications, *Arab. J. Chem. Environ. Res.*, 06 (2019) 12-56.
- 59.Abrigach, F., Rokni, Y., Takfaoui, A., (...), Asehraou, A., Touzani, R.; In vitro screening, homology modeling and molecular docking studies of some pyrazole and imidazole derivatives; *Biomedicine and Pharmacotherapy*; 103 (2018) 653-661.
60. Khan, H., Ben Hadda, T., Touzani, R.; Diverse therapeutic potential of nitidine, a comprehensive review; *Current Drug Metabolism*; 19(12) (2018) 986-991.
- 61.Abrigach, F., Karzazi, Y., Benabbes, R., (...), Saalaoui, E., Touzani, R.; Synthesis, biological screening, POM, and 3D-QSAR analyses of some novel pyrazolic compounds; *Medicinal Chemistry Research*; 26(8) (2017)1784-1795.
- 62.Abrigach, F., Bouchal, B., Riant, O., (...), Bellaoui, M., Touzani, R.; New N,N,N',N'-tetradeятate pyrazoly agents: Synthesis and evaluation of their antifungal and antibacterial activities; *Medicinal Chemistry*; 12(1) (2016)83-89.
- 63.Lotfi, N., Chahboun, N., El Hartiti, H., (...), Touzani, R., Ouhssine, M., Oudda, H.; Study of the antibacterial effect of Argan oil from Bechar region of Algeria on hospital resistant strains | [Etude de l'effet antibactérien de l'huile d'Argan de la région de Béchar de l'Algérie vis-à-vis des Souches résistantes hospitalières.]; *Journal of Materials and Environmental Science*; 6(9) (2015) 2476-2482.
- 64.Ferhat, M., Ghorab, H., Laggoune, S., (...), Touzani, R., Kabouche, A., Kabouche, Z.; Composition and antioxidant activity of the essential oil of thymus dreatensis from Algeria; *Chemistry of Natural Compounds*;50(4) (2014) 747-749.
- 65.Abrigach, F., Khoutoul, M., Merghache, S., (...), Benchat, N., Touzani, R.; Antioxidant Activities of N-((3,5-dimethyl-1H-pyrazol-1-yl)methyl)pyridin-4-amine derivatives; *Der Pharma Chemica*; 6(3) (2014) 280-285.
- 66.Abrigach, F., Khoutoul, M., Benchat, N., (...), Riant, O., Touzani, R.; Library of synthetic compounds based on pyrazole unit: Design and screening against breast and colorectal cancer; *Letters in Drug Design and Discovery*; 11(8) (2014) 1010-1016.

- 67.Saddik, R., Gaadaoui, A., Hamal, A., (...), Touzani, R., Benchat, N.; Synthesis, antibacterial and antifungal activity of some new imidazo[1,2-a]pyridine derivatives; *Der Pharmacia Lettre*; 6(4)(2014)343-348.
- 68.Zeghib, A., Laggoune, S., Semra, Z., (...), Touzani, R., Kabouche, Z.; Composition, antibacterial and antioxidant activity of the essential oil of thymus numidicus poiret from constantine (Algeria); *Der Pharmacia Lettre*; 5(3) (2013) 206-210.
- 69.Lehbili, M., Chibani, S., Kabouche, A., (...), Touzani, R., Kabouche, Z. ; Composition, antibacterial and antioxidant activity of the essential oil of Thymus guyonii de Noé from Algeria; *Der Pharmacia Lettre*; 5(2) (2013) 306-310.
- 70.Ghorab, H., Kabouche, A., Semra, Z., (...), Touzani, R., Kabouche, Z.; Biological activities and compositions of the essential oil of Thymus ciliatus from Algeria; *Der Pharmacia Lettre*; 5(1) (2013) 28-32.
- 71.Benmerache, A., Berrehal, D., Kabouche, A., (...), Touzani, R., Kabouche, Z.; Antioxidant, antibacterial activities and flavonoids of convolvulus fatmensis G. Kunze; *Der Pharmacia Lettre*; 5(1), (2013) 371-375.
- 72.Boussalah, N., Touzani, R., Souna, F., (...), Ghalem, S., El Kadiri, S.; Antifungal activities of amino acid ester functional pyrazolyl compounds against Fusarium oxysporum f.sp. albedinis and Saccharomyces cerevisiae yeast; *Journal of Saudi Chemical Society*; 17(1) (2013) 17-21.
- 73.Labed, I., Chibani, S., Semra, Z., (...), Touzani, R., Kabouche, Z.; Antibacterial activity and chemical composition of essential oil of Athamanta sicula L. (Apiaceae) from Algeria; *E-Journal of Chemistry*; 9(2) (2012) 796-800.
- 74.Bendaha, H., Yu, L., Touzani, R., (...), Brown, G.W., Bellaoui, M.; New azole antifungal agents with novel modes of action: Synthesis and biological studies of new tridentate ligands based on pyrazole and triazole; *European Journal of Medicinal Chemistry*; 46(9) (2011) 4117-4124.
- 75.Boutaghane, N., Kabouche, A., Touzani, R., (...), Bruneau, C., Kabouche, Z. ; GC/MS analysis and analgesic effect of the essential oil of Matricaria pubescens from Algeria; *Natural Product Communications*; 6(2) (2011) 251-252.
- 76.Yahyia, A., Et-Touhami, A., Yahyaouia, R., Touzani, R.; Synthesis, characterization by means of IR, ¹H, ¹³C - NMR and biological investigations on new diorganotin carboxylic acid derivatives; *Letters in Drug Design and Discovery*; 7(7) (2010) 534-540.
- 77.Bay, H.A., Quaddouri, B., Guaadaoui, A., (...), Touzani, R., Bellaoui, M., El Kadiri, S.; Synthesis and biological activity of new triazole compounds; *Letters in Drug Design and Discovery*; 7(1) (2010) 41-45.
- 78.Benmekhbi, L., Kabouche, A., Kabouche, Z., (...), Touzani, R., Bruneau, C. ; Five glycosylated flavonoids from the antibacterial butanolic extract of Pituranthos scoparius; *Chemistry of Natural Compounds*; 44(5) (2008) 639-641.
- 79.El Kodadi, M., Benamar, M., Ibrahim, B., (...), Touzani, R., Ramdani, A., Melhaoui, A.; New synthesis of two tridentate bipyrazolic compounds and their cytotoxic activity tumor cell lines; *Natural Product Research*; 21(11) (2007) 947-952.

80.Waring, M.J., Ben-Hadda, T., Kotchevar, A.T., (...), Touzani, R., Bouakka, M., Ellis, T.; 2,3-Bifunctionalized quinoxalines: Synthesis, DNA interactions and evaluation of anticancer, anti-tuberculosis and antifungal activity; *Molecules*; 7(8) (2002) 641-656.

3) Catalytic applications

81. N Bouroumane, M El Kodadi, R Touzani, M El Boutaybi, A Oussaid, ..., New Pyrazole-Based Ligands: Synthesis, Characterization, and Catalytic Activity of Their Copper Complexes *Arabian Journal for Science and Engineering*, 1-11(2021).
- 82.Titi, A., Warad, I., Tillard, M., Touzani, R., Eddike, D., Zarrouk, A.; Inermolecular interaction in $[C_6H_{10}N_3]_2[CoCl_4]$ complex: Synthesis, XRD/HSA relation, spectral and catecholase catalytic analysis; *Journal of Molecular Structure*; 1217 (2020)128422.
83. Titi, A., Shiga, T., Oshio, H., Touzani, R., Mouslim, M., Warad, I.; Synthesis of novel $Cl_2Co_4L_6$ clusterusing 1-hydroxymethyl-3,5-dimethylpyrazole (LH) ligand: Crystal structure, spectral, thermal, Hirschfeld surface analysis and catalytic oxidation evaluation; *Journal of Molecular Structure*; 1199 (2020)126995.
84. Kaddouri, Y., Haddari, H., Titi, A., El Kodadi, M., Touzani, R.; Catecholase catalytic properties of copper (II) complexes prepared in-situ with heterocyclic ligands: Experimental and DFT study; *Moroccan Journal of Chemistry*; 8(1) (2020) 184-196.
- 85.Titi, A., Oshio, H., Touzani, R., Alsalme, A., Warad, I.; Synthesis and XRD of Novel $Ni_4(\mu_3O)_4$ Twist Cubane Cluster Using Three NNO Mixed Ligands: Hirshfeld, Spectral, Thermal and Oxidation Properties; *Journal of Cluster Science* (2020).
86. Boulemche, H., Anak, B., Djedouani, A., Touzani, R., Fleutot, S., Rabilloud, F.; Synthesis, X-ray crystallography, computational studies and catecholase activity of new zwitterionic Schiff base derivatives; *Journal of Molecular Structure*; 1178 (2019) 606-616.
- 87.Boyaala, R., Touzani, R., Roisnel, T., (...), Doucet, H., Soulé, J.-F.; Catalyst-Controlled Regiodivergent C-H Arylation Site of Fluorinated 2-Arylpyridine Derivatives: Application to Luminescent Iridium(III) Complexes; *ACS Catalysis*; 9(2) (2019) 1320-1328.
- 88.Titi, A., Al-Noaimi, M., Kaddouri, Y., (...), El Kodadi, M., Touzani, R.; Study of the catecholase catalytic properties of copper (II) complexes prepared in-situ with monodentate ligands; *Materials Today: Proceedings*; 13 (2019) 1134-1142.
- 89.El Ati, R., Takfaoui, A., El Kodadi, M., (...), Touzani, R., Almalki, F.A., Ben Hadda, T.; Catechol oxidase and Copper(I/II) Complexes Derived from Bipyrazol Ligand: Synthesis, molecular structure investigation of new biomimetic functional model and mechanistic study; *Materials Today: Proceedings*; 13 (2019) 1229-1237.
- 90.Bouroumane, N., El Kodadi, M., Touzani, R., Oussaid, A., Catechol Oxidase Activity: From 2000 To 2019 : Mini Review, *Arab. J. Chem. Environ. Res.*, 06 (2019) 94-111.

- 91.Benzai, A., Derridj, F., El Ati, R., (...), Touzani, R., Ben Hadda, T., Doucet, H.; Studies of catecholase activities of N-donor bidentates ligands derivated from benzoxazole with copper (II) salts; Moroccan Journal of Chemistry; 7(2),9197 (2019) 401-409.
- 92.Boyaala, R., El Ati, R., Khoutoul, M., (...), Touzani, R., Hammouti, B.; Biomimetic oxidation of catechol employing complexes formed in situ with heterocyclic ligands and different copper(II) salts; Journal of the Iranian Chemical Society; 15(1) (2018) 85-92.
- 93.Bouanane, Z., Bounekhel, M., Elkolli, M., (...), Touzani, R., Hellal, A.; Synthesis, structural, catecholase, tyrosinase and DFT studies of pyrazoloquinoxaline derivatives; Journal of Molecular Structure; 1139 (2017) 238-246.
- 94.Boyaala, R., Touzani, R., Guerchais, V., Soulé, J.-F., Doucet, H.; Synthesis of 2-(fluorinated aryl)pyridine derivatives via palladium-catalyzed C–H bond arylation of fluorobenzenes using 2-halopyridines as aryl sources; Tetrahedron Letters; 58(33) (2017) 3205-3208.
- 95.Jahier, C., Touzani, R., El Kadiri, S., Nlate, S.; Enantiopure 24-armed dendritic polyoxometalates: Synthesis and evaluation as recoverable catalysts for asymmetric sulfide oxidation; Inorganica Chimica Acta; 450 (2016) 81-86.
- 96.Mouadili, A., Chtita, S., El Ouafi, A., (...), Zarrouk, A., Touzani, R.; Biomimetic catecholase activities by prepared in-situ complexes: Development of a quantitative structure-properties relationship (QSPR); Journal of Materials and Environmental Science; 7(1) (2016) 210-221.
97. Djedouani, A., Abrigach, F., Khoutoul, M., Mohamadou, A., Bendaas, A., Oussaid, A., Touzani, R., Catecholase Activity Investigations using in situ Copper Complexes Continuing Schiff Base Derivatives with a Theoretical Calculation. Oriental Journal of Chemistry; 31(1) (2015) 97-105.
- 98.Thabti, S., Djedouani, A., Rahmouni, S., (...), Touzani, R., Mousser, H., Mousser, A.; Synthesis, X-ray crystal structures and catecholase activity investigation of new chalcone ligands; Journal of Molecular Structure; 1102 (2015) 295-301.
99. Djedouani, A., Abrigach, F., Khoutoul, M., (...), Oussaid, A., Touzani, R.; Catecholase activity investigations using in situ copper complexes continuing Schiff base derivatives with a theoretical calculation; Oriental Journal of Chemistry; 31(1) (2015) 97-105.
100. Mouadili, A., El Ouafi, A., Attayibat, A., Radi, S., Touzani, R. ; Catecholase and tyrosinase biomimetic activities for heteroatom donor ligands: Influence of five parameters; Journal of Materials and Environmental Science; 6(8) (2015) 2166-2173.
101. Takfaoui, A., Touzani, R., Soulé, J.-F., Dixneuf, P.H., Doucet, H.; Palladium-Catalysed Direct Arylation using Free-Amine-Substituted Polyfluoroanilines with Inhibition of Amination-Type Reaction; Asian Journal of Organic Chemistry ; 4(10) (2015) 1085-1095.
102. Takfaoui, A., Lamsayah, M., El Ouafi, A., (...), Kabouche, Z., Touzani, R.; N,N'-bipyrazole compounds: Effect of concentration, solvent, ligand and metal anions on the catecholase properties; Journal of Materials and Environmental Science; 6(8) (2015) 2129-2136.

103. Mouadili, A., Al-blewi, F.F., Rezki, N., (...), El Ouafi, A., Touzani, R.; Biomimetic catecholase studies: Using in-situ prepared complexes by 1,2,4-triazole schiff bases and different metal salts; *Journal of Materials and Environmental Science*; 6(9) (2015) 2392-2399.
104. Belfilali, I., Louhibi, S., Mahboub, R., (...), Touzani, R., El Kadiri, S., Roisnel, T.; Study of the histamine copper(II) chloride complex catalytic activity; *Research on Chemical Intermediates*; 41(3), (2015) 1819-1831.
105. Takfaoui, A., Zhao, L., Touzani, R., (...), Dixneuf, P.H., Doucet, H.; One pot Pd(OAc)₂-catalysed 2,5-diarylation of imidazoles derivatives; *Tetrahedron*; 70(44) (2014) 8316-8323.
106. Takfaoui, A., Zhao, L., Touzani, R., Dixneuf, P.H., Doucet, H.; Palladium-catalysed direct diarylations of pyrazoles with aryl bromides: A one step access to 4,5-diarylpyrazoles; *Tetrahedron Letters*; 55(10) (2014) 1697-1701.
107. Takfaoui, A., Lakehal, I., Bouabdallah, I., (...), Hammouti, B., Touzani, R.; New imines bearing alkyl armed for catecholase activity; *Journal of Materials and Environmental Science*; 5(3) (2014) 753-756.
108. Mouadili, A., Lakehal, I., Takfaoui, A., (...), Messali, M., Touzani, R.; Air oxidation of catechol by in-situ copper (II) complexes with ligands containing benzyl groups; *Journal of Materials and Environmental Science*; 5(3) (2014) 715-722.
109. Mouadili, A., Attayibat, A., Radi, S., Touzani, R., Catecholase activity studies of two multidendate ligands based on pyrazole, *Arab. J. Chem. Environ. Res.*; 01 (2014) 24-32.
110. Touzani, R., Hydroformylation reaction of styrene using new rhodium pyrazole complex, *Arab. J. Chem. Environ. Res.*; 01 (2014) 76-99.
111. Mouadili, A., Attayibat, A., Kadiri, S.E., Radi, S., Touzani, R.; Catecholase activity investigations using in situ copper complexes with pyrazole and pyridine based ligands; *Applied Catalysis A: General*; 454 (2013) 93-99.
112. Toubi, Y., Touzani, R., Radi, S., El Kadiri, S.; Synthesis, characterization and catecholase activity of copper (II) complexes with bispyrazole tri-podal Ligands; *Journal of Materials and Environmental Science*; 3(2) (2012) 328-341.
113. Mouadili, A., Zerrouki, A., Herrag, L., (...), Kadiri, S.E., Touzani, R.; Catechol oxidation: Activity studies using electron rich nitrogen based ligands; *Research on Chemical Intermediates*; 38(9) (2012) 2427-2433.
114. Saddik, R., Khoutoul, M., Benchat, N., (...), S. El Kadiri, Touzani, R.; Evaluation of catalytic activity of imidazolo[1,2-a] pyridine derivatives: Oxidation of catechol; *Research on Chemical Intermediates*; 38(9) (2012) 2457-2470.
115. Saddik, R., Abrigach, F., Benchat, N., (...), Hammouti, B., Touzani, R.; Catecholase activity investigation for pyridazinone and thiopyridazinone- based ligands; *Research on Chemical Intermediates*; 38(8) (2012) 1987-1998.
116. Zerrouki, A., Touzani, R., El Kadiri, S.; Synthesis of new derivatized pyrazole based ligands and their catecholase activity studies; *Arabian Journal of Chemistry*; 4(4) (2011) 459-464.

117. Boussalah, N., Touzani, R., Bouabdallah, I., El Kadiri, S., Ghalem, S., Oxidation catalytic properties of new amino acid based on pyrazole tripodal ligands, International journal of Academic Research, 2(1) (2009) 137-143.
118. Boussalah, N., Touzani, R., Bouabdallah, I., Kadiri, S.E., Ghalem, S.; Synthesis, structure and catalytic properties of tripodal amino-acid derivatized pyrazole-based ligands; Journal of Molecular Catalysis A: Chemical; 306(1-2) (2009)113-117.
119. Kodadi, M.E., Malek, F., Touzani, R., Ramdani, A.; Synthesis of new tripodal ligand 5-(bis(3,5-dimethyl-1H-pyrazol-1-ylmethyl)amino)pentan-1-ol, catecholase activities studies of three functional tripodal pyrazolyl N-donor ligands, with different copper (II) salts; Catalysis Communications; 9(5)(2008)966-969.
120. Bouabdallah, I., Touzani, R., Zidane, I., Ramdani, A., catecholase activities of two c-c linked bipyrazole n-donor ligands with copper (ii) salts. Journal Marocain de Chimie Hétérocyclique, 6(1) (2007) 21-25.
121. Bouabdallah, I., Touzani, R., Zidane, I., Ramdani, A.; Effect of two isomeric tetrapyratzolyl ligands on the catalytic oxidation of 3,5-di-tert-butylcatechol; Journal of the Iranian Chemical Society; 4(3) (2007) 299-303.
122. Bouabdallah, I., Touzani, R., Zidane, I., Ramdani, A.; Synthesis of new tripodal ligand: N,N-bis[(1,5-dimethylpyrazol-3-yl)methyl]benzylamine. Catecholase activity of two series of tripodal ligands with some copper (II) salts; Catalysis Communications; 8(4) (2007) 707-712.
123. Le Notre, J., Touzani, R., Lavastre, O., Bruneau, C., Dixneuf, P.H.; Homologation of monoterpenoids into new sesquiterpenoids via tandem isomerisation/claisen rearrangement reactions with three-component ruthenium catalysts, and Ru(methallyl)₂ (COD) revealed by high throughput screening techniques; Advanced Synthesis and Catalysis; 347(6) (2005) 783-791.
124. Touzani, R., Alper, H.; PAMAM dendrimer-palladium complex catalyzed synthesis of five-, six- or seven membered ring lactones and lactams by cyclocarbonylation methodology; Journal of Molecular Catalysis A: Chemical; 227(1-2) (2005)197-207.
125. Garbacia, S., Touzani, R., Lavastre, O.; Image analysis as a quantitative screening test in combinatorial catalysis: Discovery of an unexpected ruthenium-based catalyst for the Sonogashira reaction; Journal of Combinatorial Chemistry; 6(3) (2004) 297-300.
126. Lavastre, O., Touzani, R., Garbacia, S.; Thin Layer Chromatography for the Detection of Unexpected Reactions in Organometallic Combinatorial Catalysis; Advanced Synthesis and Catalysis; 345(8) (2003) 974-977.
- 4) Electronic and structural studies**
127. Aït-Touchente, Z., Falah, S., Scavetta, E., Chehimi, M.M., Touzani, R., Tonelli, D., Taleb, A., Different electrochemical sensor designs based on diazonium salts and gold nanoparticles for pico molar detection of metals; Molecules, 25 (17) (2020) 3903.

128. Bouroumane, N., Lamsayah, M., Touzani, R., Khamlich, M.D., Oussaid, A., 1-Hydroxymethyl-3,5-dimethylpyrazole: Coordination with Ba (II), Hg (II) and DFT studies, Materials Today: Proceedings; online 22 July 2020.
129. El Boutaybi, A., Taleb, A., Touzani, R., Bahari, Z., Metal-organic frameworks based on pyrazole subunit for batteries applications: A systematic review, Materials Today: Proceedings; online 19 July 2020.
130. El Boutaybi, M., Taleb, A.; Touzani, R., Bahari, Z., Importance of pyrazole carboxylic acid in MOFs preparation, Arab. J. Chem. Environ. Res.; 07 (2020) 01-11.
131. Chetioui, S., Bougueria, H., Brihi, O., Merazig, H., Touzani, R.; Crystal structure, characterization and Hirshfeld analysis of bis(E)-1-[*(2,4,6*-tribromophenyl)diazenyl]naphthalen-2-olato copper(II) dimethyl sulfoxide monosolvate; Acta Crystallographica Section E: Crystallographic Communications; 76 (2020) 382-386.
132. El Assyry, A., Lamsayah, M., Warad, I., Touzani, R., Bentiss, F., Zarrouk, A.; Theoretical investigation using DFT of quinoxaline derivatives for electronic and photovoltaic effects; Heliyon; 6(3) (2020) e03620.
133. Ait-Touchente, Z., Khalil, A.M., Simsek, S., (...), Touzani, R., Chehimi, M.M.; Ultrasonic effect on the photocatalytic degradation of Rhodamine 6G (Rh6G) dye by cotton fabrics loaded with TiO₂; Cellulose; 27(2), (2020) 1085-1097.
134. Bouraoui, H., Mechehoud, Y., Chetioui, S., Touzani, R., Benmilat, A., Boudjada, A. Crystal structure and Hirshfeld surface analysis of (2E,2'E)-1,1'-[selenobis(4,1-phenylene)]bis[3-(4-chlorophenyl)prop-2-en-1-one]; Acta Crystallographica Section E: Crystallographic Communications; 75, (2020) 1724-1728.
135. Warad, I., Al-Nuri, M., Ali, O., (...), Touzani, R., Elmsellem, H.; Synthesis, physico-chemical, hirschfeld surface and DFT/B3LYP calculation of two new hexahydropyrimidine heterocyclic compounds; Iranian Journal of Chemistry and Chemical Engineering; 38(4) (2019) 59-68.
136. Kaddouri, Y., Abrigach, F., Mechbal, N., (...), Aouniti, A., Touzani, R.; Pyrazole compounds: Synthesis, molecular structure, chemical reactivity, experimental and theoretical DFT FTIR spectra; Materials Today: Proceedings; 13 (2019) 956-963.
137. Messali, M., Ati, R.E., Touzani, R., Aouad, M.R., Warad, I.; Crystal structure of the coordination polymer catena-poly[chlorido- μ 2-2-((3,5-dimethyl-1H-pyrazol-1-yl)methyl)amino)-3-hydroxybutanoato- κ 4N,N,O:O'copper(II)], C₁₁H₁₆ClCuN₂O₃; Zeitschrift fur Kristallographie - New Crystal Structures; 233(3) (2018) 493-494.
138. Setifi, F., Morgenstern, B., Hegetschweiler, K., (...), Touzani, R., Glidewell, C.; Crystal structure of meso-di- μ -chlorido-bis[bis(2,2'-bipyridine)cadmium] bis(1,1,3,3-tetracyano-2-ethoxypropenide) 0.81-hydrate; Acta Crystallographica Section E: Crystallographic Communications; 73 (2017) 48-52.
139. Chetioui, S., Rouag, D.-A., Djukic, J.-P., (...), Touzani, R., Crochet, A., Fromm, K.M.; Crystal structures of a copper(II) and the isotypic nickel(II) and palladium(II) complexes of the

- ligand (E)-1-[(2,4,6-tribromophenyl)diazenyl]naphthalen-2-ol; *Acta Crystallographica Section E: Crystallographic Communications*; 72 (2016)1093-1098.
140. Khoutoul, M., Lamsayah, M., Al-Blewi, F.F., (...), Mouslim, M., Touzani, R.; Liquid-liquid extraction of metal ions, DFT and TD-DFT analysis of some 1,2,4-triazole Schiff Bases with high selectivity for Pb(II) and Fe(II); *Journal of Molecular Structure*; 1113 (2016) 99-107.
141. Khoutoul, M., Djedouani, A., Lamsayah, M., Abrigach, F., Touzani, R.; Liquid-liquid extraction of metal ions, DFT and TD-DFT analysis for some pyrane derivatives with high selectivity for Fe(II) and Pb(II); *Separation Science and Technology (Philadelphia)*; 51(7) (2016)1112-1123.
142. Setifi, F., Knaust, J.M., Setifi, Z., Touzani, R.; Bisbis(azido- κ N)bis[bis(pyridin-2-yl- κ N)amine]- cobalt(III) sulfate dihydrate; *Acta Crystallographica Section E: Crystallographic Communications*; 72 (2016) 470-476.
143. Lamsayah, M., Khoutoul, M., Takfaoui, A., (...), Ghalem, S., Touzani, R.; N,N-bis (1H-pyrazol-1-yl) derivatives: Synthesis, Liquid-liquid extraction of metals and electronic DFT calculations; *Journal of Materials and Environmental Science*; 7(8) (2016) 2796-2805.
144. Setifi, F., Moon, D., Koen, R., (...), Lamsayah, M., Touzani, R.; Crystal structure of bis(azido- κ N)bis(quinolin-8-amine- κ 2 N,N')iron(II); *Acta Crystallographica Section E: Crystallographic Communications*; 72 (2016) 1488-1491.
145. Setifi, F., Valkonen, A., Setifi, Z., (...), Touzani, R., Glidewell, C.; Crystal structure of [tris(4,4'-bipyridine)]diium bis(1,1,3,3-tetracyano-2-ethoxypropenide) trihydrate; *Acta Crystallographica Section E: Crystallographic Communications*; 72 (2016)1246-1250
146. Khoutoul, M., Abrigach, F., Zarrouk, A., (...), Lamsayah, M., Touzani, R.; New nitrogen-donor pyrazole ligands for excellent liquid-liquid extraction of Fe²⁺ ions from aqueous solution, with theoretical study; *Research on Chemical Intermediates*;41(6) (2015) 3319-3334.
147. El Assyry, A., Hallaoui, A., Abrighach, F., (...), Touzani, R., Zarrouk, A., Lamhamdi, A.; DFT spectroscopy properties of new N-heterocyclic compounds designed for efficient photovoltaic applications; *Der Pharmacia Lettre*; 7(9) (2015) 151-160.
148. Lamsayah, M., Khoutoul, M., Takfaoui, A., (...), Oussaid, A., Touzani, R.; Selective liquid-liquid extraction of fe(II) and cd(II) using n,n'-pyrazole bidentate ligands with theoretical study investigations; *Separation Science and Technology (Philadelphia)*; 50(14) (2015) 2170-2176.
149. Bouabdallah, I., Zidane, I., Touzani, R., Malek, F., Ramdani, A., Jalbout, A.F., Trzaskowski, B., Synthesis of new C,C-linked bipyrazole, comparative theoretical calculations; *Chemical Science Transactions*; 3(2) (2014) 805-811.
150. Touzani, R., El Kadiri, S., Zerrouki, A., (...), Casino, F., Rella, R.; Optical and morphological characterization of bispyrazole thin films for gas sensing applications; *Arabian Journal of Chemistry*; 7(5) (2014) 695-700.

151. Nacer, H., Bouzenada, L., Hafaiedh, I., (...), Touzani, R., Jaffrezic-Renault, N.; Miniaturized electrochemical sensor for detection of mercury II ions; *Journal of Materials and Environmental Science*; 3(5) (2012) 846-855.
152. Touzani, R., Kadiri, S.E., Zerrouki, A., (...), Manera, M.G., Rella, R.; Solid-state detection of gases by use of thin films based on pyrazole units, and morphological characterization of the films by AFM; *Research on Chemical Intermediates*; 38(9) (2012) 2245-2254.
153. Boukla, M., Harek, H., Touzani, R., Hammouti, B., Harek, Y.; DFT and quantum chemical investigation of molecular properties of substituted pyrrolidinones; *Arabian Journal of Chemistry*; 5(2) (2012) 163-166.
154. Touzani, R., Haibach, M., Nawara-Hultsch, A.J., (...), Emge, T.J., Goldman, A.S.; Synthesis and structural characterization of new polynuclear complexes of 1-hydroxymethyl-3,5-dimethylpyrazole with Ni(II) and Fe(II); *Polyhedron*; 30(15) (2011) 2530-2534.
155. Touzani, R., El Kadiri, S., Zerrouki, A., (...), Manera, M.G., Rella, R.; Bis-pyrazole based thin films for optical gas detection; *Lecture Notes in Electrical Engineering*; 91 LNEE, (2011) 81-86.
156. Touzani, R., Vasapollo, G., Scorrano, S., (...), Rella, R., El Kadiri, S.; New complexes based on tridentate bispyrazole ligand for optical gas sensing; *Materials Chemistry and Physics*; 126(1-2) (2011) 375-380.
157. Boussalah, N., Touzani, R., Ghalem, S., El Bali, B., Dusek, M., Fejfarova, K., El Kadiri, S.; Synthesis and crystal structure of [Bis -(3,5-dimethyl-pyrazol-1-ylmethyl)-amino]-acetic acid methyl ester, *J. Mar. Chim. Heter.*, 10 (2011) 26-35.
158. Bouabdallah, I., Zidane, I., Hacht, B., Ramdani, A., Touzani, R.; Liquid-liquid extraction of metals by using new bipyrazolic compounds; *Journal of Materials and Environmental Science*; 1(1) (2010) 20-24.
159. Attayibat, A., Touzani, R., Radi, S., Ramdani, A., Hacht, B., El Kadiri, S., N-donor pyrazole ligands for liquid-liquid extraction of metal ions: mercury (II), copper (II), cadmium (II) and lead (II), *Journal Marocain de la Chimie Hétérocyclique*; 9(1) (2010) 15-25.
160. Bay, H.A., Touzani, R., Taleb, M., (...), Fejfarova, K., Kadiri, S.E.; Structure and synthesis of a new library of N,N-Bis-[1,2,4]triazol-1-ylmethyl-amino compounds; *Synthetic Communications*; 40(18) (2010) 2767-2779.
161. Attayibat, A., Touzani, R., Radi, S., El Kadiri, S., Sarimène Abdelli, S., Ghalem, S.; Quantum chemical studies on N-donors based-pyrazole compounds as corrosion inhibitors for steel in acidic media. *Asian Journal of Chemistry*, 21 (1) (2009) 105-112.
162. Herrag, L., Touzani, R., Essehl, R., El Bali, B., El Kadiri, S., synthesis and crystal structure of benzyl-(2-cyano-ethyl)-ammonium, chloride, *Journal Marocain de Chimie Hétérocyclique*, 8(1) (2009) 22-28.
163. El Kadiri, S., Ramdani, A., Touzani, R., Synthèse de ligands macrocycliques homoditopiques à unités pyrazoliques et piperazinique. *Physical and Chemical News*, 39 (2008) 104-108.

164. Bouabdallah, I., Zidane, I., Touzani, R., Ramdani, A., Jalbout, A. F., Trzaskowski, B., Theoretical calculations of three regioisomers of 1,1'-(2-nitrophenyl)-5,5'-dipropyl-3,3'-bipyrazole, Journal Marocain de Chimie Hétérocyclique. 6(1) (2007) 26-31.
165. Bouabdallah, I., Zidane, I., Hacht, B., Touzani, R., Ramdani, A.; Liquid -liquid extraction of copper (II), cadmium (II) and lead (II) using tripodal N-donor pyrazole ligands; Arkivoc; 2006(11) (2006) 59-65.
166. Bouabdallah, I., Ramdani, A., Zidane, I., Touzani, R., Eddik, D., Haidoux, A., Synthesis and crystal structure of a C,C-linked bipyrazole compound : 1,1'-Bis(4-nitrophenyl)-5,5'-diisopropyl-3,3'-bipyrazole Journal Marocain de Chimie Hétérocyclique, 5 (1)(2006) 52-57.
167. Bouabdallah, I., Zidane, I., Touzani, R., Hacht, B., Ramdani, A.; Quinoxalines and tetraketones for metal cations extraction; Arkivoc; 2006(10) (2006) 77-81.
168. Garbacia, S., Hillairet, C., Touzani, R., Lavastre, O.; New nitrogen-rich tripodal molecules based on bis(pyrazol-1-ylmethyl)amines with substituents modulating steric hindrances and electron density of donor sites; Collection of Czechoslovak Chemical Communications; 70(1) (2005) 34-40.
169. Bouabdallah, I., Ramdani, A., Zidane, I., (...), Touzani, R., Radi, S., Haidoux, A.; Synthesis, characterisation and crystal structure of a new bis-tripodal ligand: N,N,N',N'-tetrakis[(1,5-dimethylpyrazol-3-yl)methyl]-1,4- phenylenediamine; Journal of Chemical Research; (4) (2005) 242-244.
170. Bouabdallah, I., Ramdani, A., Zidane, I., Touzani, R., Eddike, D., Radi, S., Haidoux, A., Regioselective synthesis and crystal structure of 1,1'-dibenzyl-5,5'-diisopropyl-3,3'-bipyrazole. Journal Marocain de Chimie Hétérocyclique, 3(1) (2004) 39-44.
171. Touzani, R., Garbacia, S., Lavastre, O., Yadav, V.K., Carboni, B.; Efficient solution phase combinatorial access to a library of pyrazole- and triazole-containing compounds; Journal of Combinatorial Chemistry; 5(4) (2003) 375-378.
172. El Kodadi, M., Malek, F., Touzani, R., (...), El Kadiri, S., Eddike, D.; Synthesis and X-ray structure of [N,N-Bis(3,5-dimethylpyrazol-1-ylmethyl)- 1-hydroxy-2-aminoethane](3,5-dimethylpyrazole) copper(II) dinitrate; Molecules; 8(11) (2003) 780-787.
173. Touzani, R., Ben-Hadda, T., Elkadiri, S., (...), Toupet, L., Dixneuf, P.H. Solution, solid state structure and fluorescence studies of 2,3-functionalized quinoxalines: Evidence for a π -delocalized keto-enamine form with N-H \cdots O intramolecular hydrogen bonds; New Journal of Chemistry; 25(3) (2001) 391-395.

5) Other studies

174. K. Qamouche, K., Chetaine,A., Elyahyaoui, A., Moussaif, A., Touzani, R., Benkdad, A., Amsil, H., Laraki, K., Marah, H., Radiological characterization of phosphate rocks, phosphogypsum, phosphoric acid and phosphate fertilizers in Morocco: An assessment of the radiological hazard impact on the environment, Materials Today: Proceedings, 27 (4) (2020) 3224-3242.

175. Mokhtari, O., Abdellaoui, S., Hamdani, I., Aouniti, A., Touzani, R., A review on environmental and agricultiral aspects of jatophha curcas, *Arab. J. Chem. Environ. Res.*, 04 (2017) 92-106.
176. Tadrent, W., Kabouche, A., Touzani, R., Kabouche, Z.; Chemotypes investigation of essential oils of chamomile herbs: A short review; *Journal of Materials and Environmental Science*; 7(4) (2016)1229-1235.
177. Fahssi, A., Ali Yahya, H.S., Touzani, R., Chafī, A.; Evaluation spatiotemporal of the metal contamination of surface water resources in the lower Moulouya (North eastern Morocco) | [Evaluation spatiotemporelle de la contamination métallique des ressources hydriques superficielles de la basse Moulouya]; *Journal of Materials and Environmental Science*; 7(7) (2016) 2404-2423.
178. Benarbia, A., Elidrissi, A., Touzani, R., Chain mobility affecting biodegradability in lineares copolyesters, *Arab. J. Chem. Environ. Res.*, 03 (2016) 64-74
179. Nacer, H., Afia, L., Salghi, R., (...), Touzani, R., Hammouti, B., Renault, N.J.; Characterisation by electrochemical impedance spectroscopy of a pet membrane electrode based on zeolithe; *Research on Chemical Intermediates*; 41(5),1430 (2015) 3261-3273.
180. Oussaid, A., Touzani, R., Loupy, A.; Evaluation of microwave effect on the selective dealkylation of alkyl aryl ether in solvent-free heterogeneous basic media; *Journal of Materials and Environmental Science*; 5(3) (2014) 739-746.
181. Tadrent, W., Kabouche, A., Touzani, R., Kabouche, Z.; Chemotypes investigation of essential oils of 'Guertoufa' herbs; *Journal of Materials and Environmental Science*; 5(4) (2014) 1200-1205.
182. Belhadj Mostefa, M., Kabouche, A., Abaza, I., (...), Touzani, R., Kabouche, Z.; Chemotypes investigation of Lavandula essential oils growing at different North African soils; *Journal of Materials and Environmental Science*; 5(6) 2014) 1896-1901.
183. Benarbia, A., Elidrissi, A., Ganetri, I., Touzani, R.; Synthesis, characterization and thermal degradation kinetics of copolyesters; *Journal of Materials and Environmental Science*; 5(4) (2014) 1262-1279.
184. Bouratoua, A., Ferhat, M., Kabouche, A., (...), Touzani, R., Kabouche, Z. ; Comparative compositions of essential oils of Ferula; *Journal of Materials and Environmental Science*; 5(4) (2014)1214-1217.
185. Belhadj Mostefa, M., Kabouche, A., Abaza, I., (...), Touzani, R., Kabouche, Z.; Chemotypes investigation of Lavandula essential oils growing at different North African soils; *Journal of Materials and Environmental Science* ; 5(6) (2014) 1896-1901.
186. Chibani, S., Gherboudj, W., Kabouche, A., (...), Touzani, R., Aburjai, A., Kabouche, Z.; GC-MS analysis of senecio giganteus desf. from Algeria; *Journal of Essential Oil-Bearing Plants*; 16(1) (2013)123-125.
187. Boutevin, B., Ameduri, B., Elidrissi, A., Touzani, R.; Synthesis and properties of long-chain aromatic telechelic monodispersed diols radical-initiated, addition of 2-mercaptopropanol onto

- α , ω nonconjugated dienes; Phosphorus, Sulfur and Silicon and the Related Elements; 187(4) (2012) 482-494.
188. Khalfallah, A., Berrehal, D., Kabouche, A., Touzani, R., Kabouche, Z.; Flavonoids from centaurea omphalodes ; Chemistry of Natural Compounds; 48(3) (2012) 482-483.
189. Bencheraiet, R., Kabouche, A., Kabouche, Z., Touzani, R., Jay, M. ; Flavonoids from physospermum actaeaefolium; Chemistry of Natural Compounds ; 48(3) (2012) 480-481.
190. Bensouici, C., Kabouche, A., Kabouche, Z., Touzani, R., Bruneau, C.; Sesquiterpene lactones and flavonoids from centaurea foucauldiana; Chemistry of Natural Compounds; 48(3) (2012) 510-511.
191. Bencheraiet, R., Kabouche, A., Kabouche, Z., Touzani, R., Jay, M.; Flavonol 3-O-glycosides from three algerian Bupleurum species; Records of Natural Products; 6(2) (2012) 171-174.
192. Chibani, S., Bensouici, C., Kabouche, A., (...), Touzani, R., Kabouche, Z.; Analysis of the essential oil of aerial parts of ferula lutea poiret from algeria; Journal of Essential Oil-Bearing Plants; 15(4) (2012) 682-685.
193. Touzani, R., El Kadiri, S., Synthesis of new nitrogen rich tridentate ligands N,N-Bis(1H-1,2,4-triazol-1-Ylmethyl)amines, J. Mar. Chim. Heter.; 10 (2011) 50-58.
194. Touzani, R.; Dendrons, dendrimers new materials for environmental and science applications; Journal of Materials and Environmental Science; 2(3) (2011) 201-214.
195. Kabouche, A., Kabouche, Z., Touzani, R., Bruneau, C.; Flavonoids from Centaurea sulphurea; Chemistry of Natural Compounds; 46(6) (2011)966-967.
196. Labed, A., Labed, I., Safaei-Ghomí, J., (...), Touzani, R., Kabouche, A., Kabouche, Z.; GC-MS Analysis of Oenanthe virgata Poiret (Apiaceae) from Algeria; Journal of Essential Oil-Bearing Plants; 14(4) (2011) 481-483.
197. Lakhal, H., Boudiar, T., Kabouche, A., (...), Touzani, R., Bruneau, C.; New sesquiterpene lactone and other constituents from Centaurea sulphurea (Asteraceae); Natural Product Communications; 5(6) (2010) 849-850.
198. Touzani, R., Ramdani, A., El Kadiri, S., Synthesis and applications: ten years of experience in monodentate, bidentate, tridentate and macrocycle pyrazole heterocyclic chemistry, special review, International Journal of Physical Sciences, 4 (13) (2009) 906-912.
199. Kabouche, A., Kabouche, Z., Touzani, R., Bruneau, C.; Diterpenes and sterols from the roots of Salvia verbenaca subsp. clandestina; Chemistry of Natural Compounds; 44(6) (2008) 824-825.
200. Elidrissi, A., Krim, O., Ouslimane, S., Berrabeh, M., Touzani, R.; Synthesis, characterization, and chemical degradation of segmented polyurethanes with butylamine for chemical recycling; Journal of Applied Polymer Science; 105(3) (2007)1623-1631.
201. Bouabdallah, I., Zidane, I., Touzani, R., Ramdani, A., Jalbout, A.F., Trzaskowski, B., New 1-(4-nitrophenyl)-5,5'-diisopropyl-3,3'-bipyrazole. Molbank (2006) M490/1-3.

202. Bouabdallah, I., Zidane, I., Touzani, R., Ramdani, A., Jalbout, A.F., Trzaskowski, B., New 1-(ethyl-ethanoate-yl)-5,5'-diisopropyl-3,3'-bipyrazole. Molbank (2006) M491 /1-3.
203. Bouabdallah, I., Ramdani, A., Zidane, I., Touzani, R., 1,1'-dibenzyl-5,5'-diphenyl-3,3'-bipyrazole. Molbank (2006) M482/1-2.
204. Bouabdallah, I., Ramdani, A., Zidane, I., Touzani, R., N,N-bis[(1,5-dimethylpyrazol-3-yl)methyl]para-toluidine. Molbank (2006) M483/1-2.
205. Herrag, L., Touzani, R., Ramdani, A., Hammouti, B., 1-{[Benzyl-(2-cyano-ethyl)-amino]-methyl}-5-methyl-1H-pyrazole-3-carboxylic acid methyl ester. Molbank (2006) M493/1-2.
206. Herrag, L., Touzani, R., Ramdani, A., Hammouti, B., 1-{[Benzyl-(2-cyano-ethyl)-amino]-methyl}-5-methyl-1H-pyrazole-3-carboxylic acid ethyl ester. Molbank (2006) M494/1-2.
207. Herrag, L., Touzani, R., Ramdani, A., Hammouti, B., 3-[Benzyl-(3,5-dimethyl-pyrazol-1-ylmethyl)-amino]-propionitrile. Molbank (2006) M495/1-2.
208. Herrag, L., Touzani, R., Ramdani, A., Hammouti, B., 3-[Benzyl-(1,5-dimethyl-1H-pyrazol-3-ylmethyl)-amino]-propionitrile. Molbank (2006) M496/1-2.
209. Bouabdallah, I., Touzani, R., Zidane, I., Ramdani, A., Radia, S.; Synthesis of new 1,1'-di(4-nitro or 2-nitrophenyl)-5,5'-disubstituted-3,3'-bipyrazoles under microwave irradiation and classical heating conditions; Arkivoc; 2006(14) (2006) 46-52.
210. Bouabdallah, I., Touzani, R., Zidane, I., Ramdani, A., Radi, S.; Synthesis of some 1-aryl-3,5-disubstituted-pyrazoles by N-arylation of 3,5-disubstituted-pyrazoles with 4-fluoro and 2-fluoronitrobenzene under microwave irradiation and classical heating; Arkivoc; 2006(12) (2006)138-144.
211. Touzani, R., Ramdani, A., El Kadiri, S., 10,14-Dibenzyl-6,18-dimethyl-1,5,10,14,19,20-hexaazatricyclo[14.2.1.15,8]eicosa-6,8(20),16(19),17-tetraen-12-ol. Molbank (2005) M446/1-M446/2.
212. Touzani, R., Ramdani, A., El Kadiri, S., 7,20-Dimethyl-11,16-bis(pyridin-2-ylmethyl)-1,6,11,16,21,22-hexaazatricyclo [16.2.1.16,9]docosa-7,9(22),18(21),19-tetraene. Molbank (2005) M445/1-M445/2.
213. Touzani, R., Ramdani, A., El Kadiri, S., 6,19-dimethyl-10,15-bis(pyridin-2-ylmethyl)-1,5,10,15,20,21-hexaaza-tricyclo[15.2.1.15,8] heneicos-6,8(21),17(20),18-tetraene. Molbank (2005) M443/1-M443/2.
214. Touzani, R., Ramdani, A., El Kadiri, S., 7,11,15,19-Tetramethyl-1,6,11,15,20,21-hexaazatricyclo[15.2.1.16,9]heneicosa-7,9(21),17(20),18-tetraene. Molbank (2005) M441/1-M441/2.
215. Touzani, R., Ramdani, A., El Kadiri, S., 6,10,14,18-Tetramethyl-1,5,10,14,19,20-hexaazatricyclo[14.2.1.15,8]eicosa-6,8(20), 6(19), 17-tetraene. Molbank (2005) M440/1-M440/2.
216. Bouabdallah, I., Ramdani, A.; Zidane, I., Touzani, R., 1-(Hydroxymethyl)-3-phenyl-5-methylpyrazole. Molbank (2005) M427/1- M427/2.

217. Bouabdallah, I., Ramdani, A., Zidane, I., Touzani, R., 1-(Hydroxymethyl)-3,5-diphenylpyrazole. Molbank (2005) M426/1-M426/2.
218. Bouabdallah, I., Zidane, I., Touzani, R., Ramdani, A., N¹,N¹-bis[(3,5-dimethyl-1-pyrazolyl)methyl]-N,N-dimethyl-p-phenylenediamine. Molbank (2005) M398/1-M398/2.
219. Bouabdallah, I., Zidane, I., Touzani, R., Ramdani, A., N,N-Bis[(1,5-dimethylpyrazol-3-yl)methyl]aniline. Molbank (2005) M397/1-M397/2.
220. El Kodadi, M., Malek, F., Touzani, R., Ramdani, A., 2-{bis[(1,5-dimethyl-1H-pyrazol-3-yl)methyl]amino}ethanol. Molbank (2004) M370.
221. El Kodadi, M., Malek, F., Touzani, R., Zidane, I., Bouabdallah, I., Ramdani, A., 2-[6-methyl-3-(2-(4-methylphenyl)-2-oxoethylidene)-1,4-dihydro-quinoxalin-2(1H)-ylidene]-1-(4-methylphenyl)ethanone. Molbank (2004) M356.
222. El Kodadi, M., Malek, F., Touzani, R., Zidane, I., Bouabdallah, I., Ramdani, A., 2-[3-(2-(4-methylphenyl)-2-oxoethylidene)-1,4-dihydro-quinoxalin-2(1H)-ylidene]-1-(4-methylphenyl)ethanone. Molbank (2004) M355.
223. Bouabdallah, I., Zidane, I., Touzani, R., Malek, F., El Kodadi, M., Ramdani, A., 3-methyl-1-[3-(3-methyl-2-oxobutylidene)-1,4-dihydro-6-nitro-quinoxalin-2-ylidene]butan-2-one. Molbank (2004) M385.
224. Bouabdallah, I., Zidane, I., Touzani, R., Malek, F., El Kodadi, M., Ramdani, A., 3-methyl-1-[3-(3-methyl-2-oxobutylidene)-1,4-dihydro-6-methyl-quinoxalin-2-ylidene]butan-2-one. Molbank (2004) M384.
225. Bouabdallah, I., Zidane, I., Touzani, R., Malek, F., El Kodadi, M., Ramdani, A., 3-methyl-1-[3-(3-methyl-2-oxobutylidene)-1,4-dihydro-quinoxalin-2-ylidene]butan-2-one. Molbank (2004) M383.
226. Bouabdallah, I., Zidane, I., Malek, F., Touzani, R., El Kodadi, M., Ramdani, A., 2-[3-(2-Oxo-2-phenylethylidene)-1,4-dihydro-6-methyl Quinoxalin-2-ylidene]-1-phenyl Ethanone. Molbank (2003) M346.
227. Bouabdallah, I., Zidane, I., Malek, F., Touzani, R., El Kodadi, M., Ramdani, A., 3,8-Dihydroxy-2,9-dimethyl Deca-3,7-diene-5,6-dione. Molbank (2003) M345.
228. Nacer, A., Bernard, A., Boustie, J., Touzani, R., Kabouche, Z.; Aglycone flavonoids of Centaurea tougourensis from Algeria; Chemistry of Natural Compounds; 42(2) (2006) 230-231.
229. Berhili, F., Touzani, R., Ramdani, A., El Kadiri, S., 10,14-(Cyanomethyl)-6,18-dimethyl-1,5,9,14,19,20-hexaazatricyclo[1.4.2.1.15,8] eicosa-6,8(20),16(19),17-tetraene. Molbank (2003) M313.
230. Berhili, F., Touzani, R., Ramdani, A., El Kadiri, S., 10,14-Dibenzyl-6,18-dimethyl-1,5, 10, 14,19,20-hexaazatricyclo[14.2.1.15,8]icos-6,8(20),16(19),17-tetraene. Molbank (2003) M312.

231. Berhili, F., Touzani, R., Ramdani, A., El Kadiri, S., 8,12-Dibenzyl-4,16-dimethyl-1,3,8, 12, 17,18-hexaazatricyclo[12.2.1.13,6]octadeca-4,6(18),14(17),15-tetraene. Molbank (2003) M311.
232. Berhili, F., Touzani, R., Ramdani, A., El Kadiri, S., 4,8,12,16-Tetramethyl-1,3,8,12,17,18-hexaazatricyclo[12.2.1.13,6]octadeca-4,6(18),14(17),15-tetraene. Molbank (2003) M310.
233. Berhili, F., Touzani, R., Ramdani, A., El Kadiri, S., 8,12-Diethyl-4,16-dimethyl-1,3,8,12,17,18-hexaazatricyclo[12.2.1.13,6]octadeca-4,6(18),14(17),15-tetraene. Molbank (2003) M309.
234. Berhili, F., Touzani, R., Ramdani, A., El Kadiri, S., 4,8,11,15-Tetramethyl-1,3,8,11,16,17-hexaazatricyclo[11.2.1.13,6]heptadeca-4,6(17),13(16),14-tetraene. Molbank (2003) M308.
235. Touzani, R., Ramdani, A., Ben-Hadda, T., (...), Le Bozec, H., Dixneuf, P.H.; Efficient synthesis of new nitrogen donor containing tripods under microwave irradiation and without solvent; Synthetic Communications; 31(9) (2001) 1315-1321.
236. Touzani, R., Ramdani, A., El Kadiri, S.; 1-Hydroxymethyl-3-methoxy-5-methyl pyrazole; Molecules; 5(2) (2001) M139.
237. Touzani, R., Ramdani, A., El Kadiri, S., Gourand, F.; 1-Hydroxymethyl-3-ethoxy-5-methylpyrazole; Molecules; 4(11) (1999) M116.

Books and Book chapters

1- Etude expérimentales & théoriques de nouveaux dérivés pyrazoliques
Synthèse, caractérisation, évaluation biologique et modélisation moléculaire par docking ;
F. Abrigach and **R. Touzani** ;
Editions universitaires européennes ; ISBN: 978-613-8-47403-6 (2019).

2-Synthese of heterocyclique pallido-catalysee via activation C-H
A. Takfaoui, H. Doucet, **R. Touzani**
Premiere Edition: UMP, DL: 2018MO2772, ISBN:978-9954-689-15-8 (2018).

3- Chimie Biomimetique : vers des catalyseurs biomimetiques plus en plus efficaces
A. Mouadili, **R. Touzani**
Premiere edition: UMP, DL: 2018MO2773, ISBN:978-9954-689-16-5 (2018).

4- DFT and Quantum Chemical Studies for Heterocyclic Compounds Used as Corrosion Organic Inhibitors
A. Zarrouk, B. Hammouti & **R. Touzani**
LAP Lambert Ac. Publishing Ed. ISBN:978-3-659-21601-5, (2012).

5- Bis pyrazole based thin films for optical gas detection
R. Touzani, S. El Kadiri, A. Zerrouki, S. Scorrano, G. Vasapollo, M. G. Manera, F. Casino, R. Rella
Proceeding AISEM2010, 8-10 febbraio 2010, Messina (Italia), edito da G. Neri et al., Capitolo 11, Sensors and Microsystems, ISBN: 978-94-007-1323-9 (2011).

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Mr. Yassine Kaddouri	Defended on July, 23, 2020
Mr. Morad Lamsayah	Defended on March, 24, 2018
Mr. Mohamed Khoutoul	Defended on July, 15, 2017
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INVOLVEMENT IN MANY RESEARCH PROJECTS

- 1) Project : MENFPESRS-ANPMA-UMP-CNRST : Formulations fongiques, insecticide ou acaricides d'Huiles essentielles des plantes aromatiques et médicinales et de leurs extraits aqueux (2020-2023).
- 2) Project: CNRST-CNRI: between University Mohammed Premier, Oujda Morocco and University of Bari Italie (New MOFs based on Pyrazole ligand: Crystal structure and Biological evaluation (2020-2021).
- 3) Project : CNRST-PPR2-P10 : Elaboration de Nouveaux Matériaux Greffés pour la Catalyse et le Piégeage des Métaux Toxiques (2016-2020).
- 4) Project: CNRST-CNRI: between University Mohammed Premier, Oujda Morocco and University of Lecce Italie (Elaboration and environmental application of organic probes based on pyrazole and pyridine derivatives) (2009-2010).

- 5)** Project : CNRST-CNR France : Recherche de nouveaux agents thérapeutiques dendritiques contre les maladies infectieuses CHIMIE 07/08 (208-2009).
- 6)** Project : CNRST-CNR France : Organométallique et Catalyse : chimie et électrochimie moléculaire, Action Intégrée N° 98 /160/SM (1999-2000).

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- 1) Title: very long
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- 3) Keywords: add Green Chemistry
- 4) Introduction: human health and ecological system [XX]; near to each application put the adequate reference not in the end of the paragraph to make it easy for the interested audience.
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With regards

Dear all,

Greetings

In my opinion your work can be accepted for publication in Journal of Molecular Structure after minor revision and after fixing all these points:

- 1) Title is very long
- 2) Abstract add the best synthetic methodologies with the appropriate yields
- 3) Keywords add Heterocyclic Compounds
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- 6) add also NMR spectrum proton and carbon such a single figure to your manuscript (one example is more than enough).
- 7) references are shifted to write side please fix them and add these references (- Y Kaddouri, et al., Bioorganic Chemistry 110 (2021) 104696; - Y Kaddouri, et al., Current Drug Delivery (2021); - F Abrigach, et al., Biomedicine and Pharmacotherapy; 103 (2018) 653; - F Abrigach, Medicinal Chemistry Research; 26(8) (2017)1784).

With regards