

Supplementary material

Laccase Immobilized Fe₃O₄-graphene oxide nanobiocatalyst for the enhancement of Enzyme Stability and Immobilization Efficiency in the Green Synthesis of Sulfa drugs

Shamila Rouhani ^{1,*}, Shohreh Azizi ², Rose W Kibechu³, Bhekie B Mamba ¹ and Titus A.M. Msagati ¹

¹ Nanotechnology and Water Sustainability Research (NanoWS) Unit, College of Science, Engineering and Technology, University of South Africa, Johannesburg, South Africa, 1709

² UNESCO-UNISA Africa Chair in Nanoscience and Nanotechnology College of Graduates Studies, University of South Africa, Muckleneuk Ridge, Pretoria, South Africa, 392

* Correspondence: rouhas@unisa.ac.za, sh.rouhani78@yahoo.com

Spectral data of some synthesized compounds:

2,3-Dihydro-2-tosylphthalazine-1,4-dione (Table 3, entry 2). Isolated yield: 95%. Mp. >273 °C (dec.), yellow. IR (KBr, cm⁻¹): ν 2521, 1742, 1668, 1501, 1288, 1267, 1196, 1123, 1080, 1035, 825, 779, 665, 602, 556, 384, 245. ¹H NMR (300 MHz, DMSO-d₆): δ 1.67 (s, 3H), 6.90 (d, 2H), 7.54 (d, 2H), 7.86 (d, 2H), 8.12 (d, 2H), 12.10 (NH, 1H). ¹³C NMR (75 MHz, DMSO-d₆): δ 24.43, 119.98, 126.57, 126.68, 128.29, 128.47, 129.97, 135.62, 136.68, 153.12, 157.22.

2-(Phenylsulfonyl)-2,3-dihydrophthalazine-1,4-dione (Table 3, entry 1): Isolated yield: 81%. Mp. >273 °C (dec.), yellow. IR (KBr, cm⁻¹): ν 2917, 1643, 1503, 1345, 1321, 1253, 1215, 1074, 1015, 831, 765, 652, 621, 473, 437. ¹H NMR (300 MHz, DMSO-d₆): δ 6.78 (d, 2H), 7.94 (m, 3H), 7.67 (d, 2H), 8.23 (d, 2H) 10.65 (NH, 1H). ¹³C NMR (75 MHz, DMSO-d₆): δ 120.14, 126.25, 128.32, 128.47, 128.67, 130.73, 131.23, 133.98, 156.21, 162.97.



© 2019 by the authors. Submitted for possible open access publication under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).