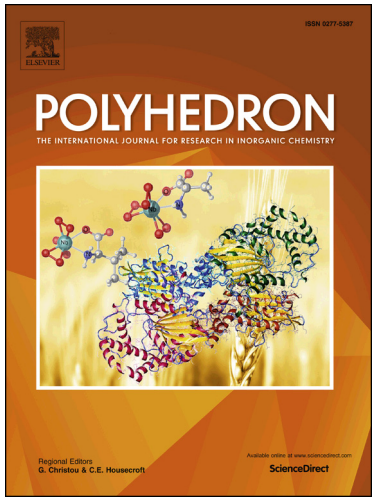

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PII: S0277-5387(18)30273-0
DOI: https://doi.org/10.1016/j.poly.2018.05.035
Reference: POLY 13182

To appear in: *Polyhedron*

Received Date: 15 February 2018
Accepted Date: 17 May 2018

Please cite this article as: M.S.S. Adam, A.D.M. Mohamad, Catalytic (ep)oxidation and corrosion inhibition potentials of Cu^{II} and Co^{II} pyridinylimino phenolate complexes, *Polyhedron* (2018), doi: https://doi.org/10.1016/j.poly.2018.05.035

Catalytic (ep)oxidation and corrosion inhibition potentials of Cu^{II} and Co^{II} pyridinylimino phenolate complexes

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Abstract

The coordination chemical behavior of pyridinylimino phenolate sodium sulfonate (HPSS) was examined with Cu^{II} and Co^{II} ions to give two novel para-magnetic complexes, CuPSSACl and $Co(PSS)_2$, respectively. In CuPSSACl, Cu^{2+} ion reacts with HPSS in 1 : 1 and 1 : 2 of Co^{2+} ion to HPSS in $Co(PSS)_2$, respectively. Various physico-chemical spectroscopic tools were applied to characterize their molecular structures. The spectrophotometric measurements were used to determine the formation constants, K_f. CuPSSACl and $Co(PSS)_2$ exhibited performed catalytic potential towards the (ep)oxidation of 1,2-cyclooctene by an aqueous H_2O_2 under alternative conditions. The catalytic sufficiency of CuPSSACl and $Co(PSS)_2$ was influenced by other parameters (temperature, solvent and oxidant). CuPSSACl is more effective catalyst than $Co(PSS)_2$. The corrosion inhibition of HPSS and its chelates (CuPSSCl and $Co(PSS)_2$) on carbon steel (CS) in HCl solution were studied using electrochemical (potentiodynamic polarization, PDP and electrochemical impedance spectroscopy, EIS) and surface (SEM and EDX) techniques. The inhibition efficiency incremented with the inhibiting agent concentrations following the sequence: CuPSSCl > $Co(PSS)_2$ > HPSS. Thermodynamically, those compounds act as mixed-type inhibiting agents and obeyed Langmuir adsorption isotherm *via* chemisorption. SEM and EDX investigations confirmed the protective efficiency of the titled inhibiting agents on CS in HCl.

Key words: Copper (II), cobalt (II), imine, epoxidation, catalysis, corrosion inhibitors, carbon steel.

1. Introduction