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Synthesis, characterization and catalytic applications of new monodentate N-alkylpyridin-4 (1H)ylidene) amines (PYE) ligands

Sabeen Zahra
University of Gujrat, Pakistan

The present study describes the synthesis, characterization and applications of protonated pyridinium amide (H-PYE) and pyridinium amide (PYE) ligands itself. H-PYE ligands [HL1-HL4] were synthesized by a solid state reaction between 4-chloro-*N*-methyl pyridinium triflate and corresponding amines at 220°C. PYE ligands [L1-L4] were synthesized by deprotonation of the H-PYE ligands with sodium hydride in dichloromethane solvent. Both H-PYE and PYE ligands were characterized by physical parameters, FT-IR, ^{1}H and ^{13}C NMR and mass spectrometry. The role of pyridinium amide ligands towards Suzuki-Miyaura and Heck-Mizoroki coupling reactions in the presence of Pd $(OAc)_2$ was monitored and achieved remarkable results. The antioxidant activity of synthesized ligands was observed by scavenging method of DPPH radical and ligands exhibited significant activity. The biological activities of synthesized compounds were tested against four bacterial and two fungal strains and results indicated that only [HL4] displayed antibacterial activity with C*hromohalobacter israelensi* while both H-PYE and PYE showed minor antifungal activity with one of the strain *Aspergillus niger.* Enzyme inhibition activity of the ligands was performed against two enzymes i.e. acetylcholine esterase and butyrylcholin esterase. The results specified that ligands presented good inhibition. Moreover, the DNA binding studies were achieved by using UV-Visible and fluorescence emission spectroscopy which revealed hypochromic effect indicating intercalation as well as groove mode of binding.

meen.yani@yahoo.com

Material selection using MERDE method: A new multiple attribute decision making method

V P Darji and **R V Rao**
S V National Institute of Technology, India

Manufacturing environment advancement has become extensively precise in measurement of performance using multi criteria decision making method. Material selection for the specific applications with specific properties from a large number of alternatives is a difficult task. In this paper, a new simple, rational and systematic decision making method named MERDE is proposed. The flexibility for it application is demonstrated using ten material selection problems. The mathematical procedure of MERDE method is based on arithmetic mean and consisting of a new way of normalization of the data set to make them dimensionless.

veera.jani@rediffmail.com