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Synthesis, characterization and catalytic application of a coordination compound of cobalt(II) based on 2,6-pydc and TMDP for degradation of dyes under dark

Aieshri Swargiary^a, Tanmoy Kumar Ghosh^b, Anamika Kalita Deka^a & Arunendu Mondal^{*a}

^a Department of Chemistry, Central Institute of Technology Kokrajhar (Deemed to University under Ministry of Education, Govt. of India), Kokrajhar 783 370, Assam, India

^b Department of Chemistry, University College of Science, University of Calcutta, Kolkata 700 009, India
E-mail: a.mondal@cit.ac.in

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A cobalt(II) coordination polymer of 2,6-pyridinedicarboxylic (2,6-pydc) and 4,4'-trimethylenedipyridine (4,4'-TMDP) has been resynthesized by a new synthetic method. The polymer is then characterized through single crystal XRD (SC-XRD) analysis. Variety of other techniques such as elemental analysis, TGA, fluorescence spectroscopy, UV-Vis spectroscopy, FTIR spectroscopy and magnetic study have been employed for further characterization. This coordination polymer has been explored as a catalyst for degradation of methyl orange (MO) and Congo red (CR) in an aqueous medium with the reducing agent sodium borohydride (NaBH_4) under dark. Surprisingly, it is observed that 96.41% and 97.22% degradation of MO and CR dyes occurs within 8 and 10 minutes with rate constants 0.491 min^{-1} and 0.264 min^{-1} respectively.

Keywords: 4,4'-Trimethylenedipyridine, 2,6-Pyridinedicarboxylic acid, Methyl orange, Congo red

... in the last few decades has composite materials^{11,12} and metal-coordinated