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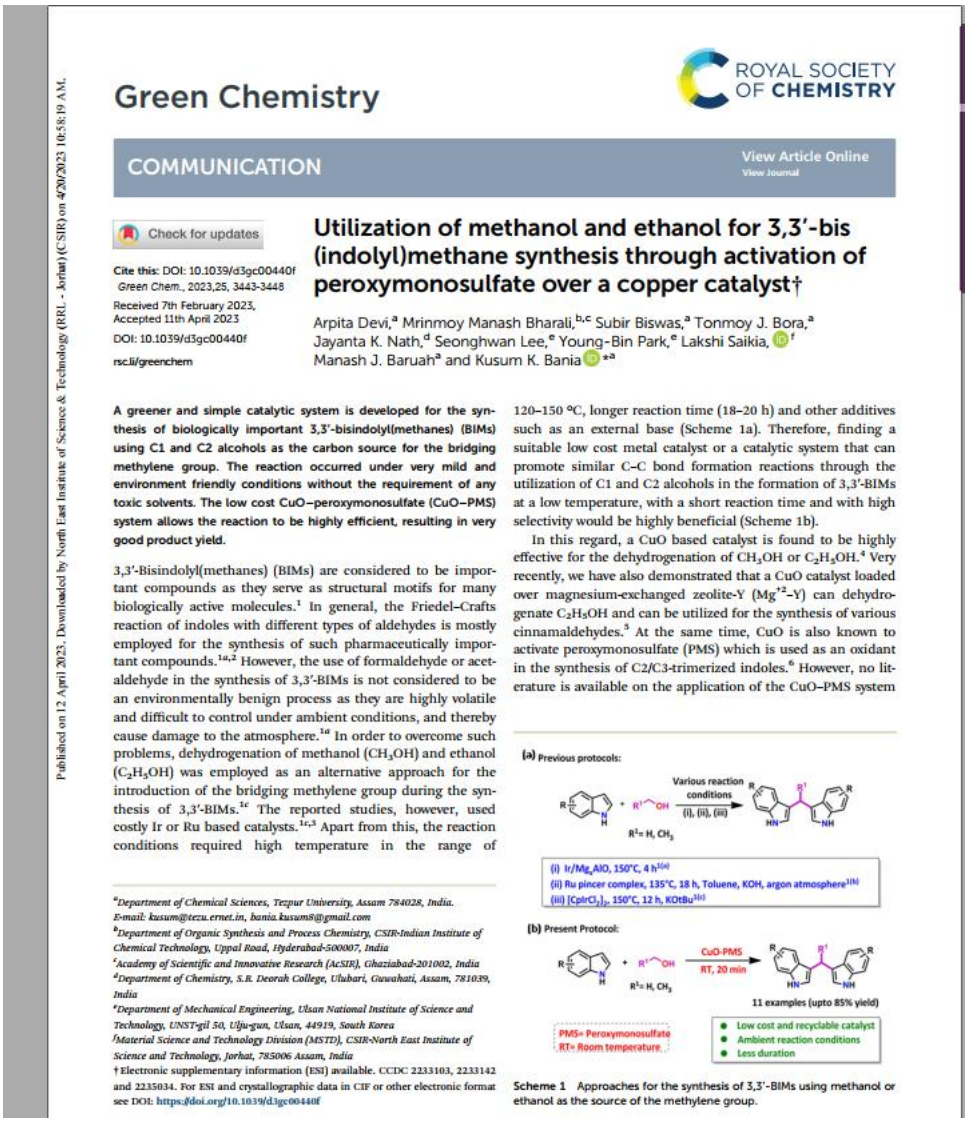
The Institution has several collaborations/linkages for Faculty exchange, Student exchange, Internship, Field trip, On-the- job training, research etc. during the year

Research Collaboration

21. Dr. Jayantha K. Nath, Assistant Professor, Department of Chemistry, S. B. Deorah College, has Research Collaboration with Dr. Kusum Bania, Professor, Dept of Chemical Sciences, Tezpur University.



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Utilization of methanol and ethanol for 3,3′-bis (indolyl)methane synthesis through activation of peroxymonosulfate over a copper catalyst†

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A greener and simple catalytic system is developed for the synthesis of biologically important 3,3′-bisindolyl(methanes) (BIMs) using C1 and C2 alcohols as the carbon source for the bridging methylene group. The reaction occurred under very mild and environment friendly conditions without the requirement of any toxic solvents. The low cost CuO–peroxymonosulfate (CuO–PMS) system allows the reaction to be highly efficient, resulting in very good product yield.

3,3′-Bisindolyl(methanes) (BIMs) are considered to be important compounds as they serve as structural motifs for many biologically active molecules.[1] In general, the Friedel–Crafts reaction of indoles with different types of aldehydes is mostly employed for the synthesis of such pharmaceutically important compounds.[1a,2] However, the use of formaldehyde or acetaldehyde in the synthesis of 3,3′-BIMs is not considered to be an environmentally benign process as they are highly volatile and difficult to control under ambient conditions, and thereby cause damage to the atmosphere.[1a] In order to overcome such problems, dehydrogenation of methanol (CH_3OH) and ethanol (C_2H_5OH) was employed as an alternative approach for the introduction of the bridging methylene group during the synthesis of 3,3′-BIMs.[1c] The reported studies, however, used costly Ir or Ru based catalysts.[1c,3] Apart from this, the reaction conditions required high temperature in the range of 120–150 °C, longer reaction time (18–20 h) and other additives such as an external base (Scheme 1a). Therefore, finding a suitable low cost metal catalyst or a catalytic system that can promote similar C–C bond formation reactions through the utilization of C1 and C2 alcohols in the formation of 3,3′-BIMs at a low temperature, with a short reaction time and with high selectivity would be highly beneficial (Scheme 1b).

In this regard, a CuO based catalyst is found to be highly effective for the dehydrogenation of CH_3OH or C_2H_5OH.[4] Very recently, we have also demonstrated that a CuO catalyst loaded over magnesium-exchanged zeolite-Y (Mg^{+2}–Y) can dehydrogenate C_2H_5OH and can be utilized for the synthesis of various cinnamaldehydes.[3] At the same time, CuO is also known to activate peroxymonosulfate (PMS) which is used as an oxidant in the synthesis of C2/C3-trimerized indoles.[6] However, no literature is available on the application of the CuO–PMS system

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Scheme 1 Approaches for the synthesis of 3,3′-BIMs using methanol or ethanol as the source of the methylene group.