Synthesis and Characterization of 1D-MoO_3 Nanorods Using *Abutilon indicum* Extract for the Photoreduction of Hexavalent Chromium

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Abstract

In this present work, we report a novel green synthesis of MoO_3 nanorods (NRs) utilizing *Abutilon Indicum* (*A. Indicum*) plant extract, containing palmitric, linoleic, linolinic acids and their derivatives which might be acting as both reducing and stabilizing agents. The synthesized catalyst has been employed to reduce toxic Cr(VI) to Cr(III) in the aqueous solution which was continuously monitored by UV–Vis absorbance spectroscopy. The structural, optical and morphological characterizations are performed using PXRD, UV-DRS, PL, FESEM, TEM, FT-IR and EDAX. The optical properties were precisely investigated by calculating the Tauc's relation. The band gap of as synthesized MoO_3 was found to be 2.57 eV (483 nm) which falls under visible region, thus catalyst can be activated under solar light which could be cost effective. Biologically synthesized MoO_3 NRs showed highest activity, i.e., almost 99% toward reduction of Cr(VI) under solar light. In addition to this, the photo firmness and reusability test showed that the catalyst can be reused upto five cycles without waning its activity.