Sensitized Nanoparticles of Semiconductors for Water Purification

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Abstract:

Widely spread of chemically industry producing many types of environmentally pollutants (e.g dyes, herbicides, pesticides, insecticides, drugs, and others), most of these pollutants reaches our drinking water resources, different strategies have been followed to purify contaminated water, one of the low-cost technology is using semiconductors as catalyst for photodegradation of water organic contaminants, TiO2 is widely studies for water treatment, however, the wide band gab TiO2 limits its use in the UV range, which is less than 4% of our reaching-in solar spectrum. Therefore, sensitization of TiO2 has been studied in order to activate the photodegradation processes by the visible light.

our previous work was used CdS (~2.3 eV) to sensitized TiO2, the prepared catalyst TiO2/CdS shows catalytic efficiency in visible light toward photodegradation of organic water contaminants (Methyl Orange & Phenazopyridine), during the photodegradation process the CdS observed decomposition producing Cd+2 ions in the treated water.

A save, economic, nontoxic natural dye (Anthocyanin) is being used to sensitized TiO2 nanoparticles, the produced catalyst TiO2/Anth and AC/TiO2/Anth were tested for photodegradation of both Methyl Orange and Phenazopyridine under visible light, the prepared catalysts show an observable efficiency towered photodegradation water organic contaminants. The efficient degradation was observed in photodegradation Methyl Orange using AC/TiO2/Anth under acidic condition. complete mineralization of contaminants was confirmed by the potential increasing of menial ions like NO-3, SO4-2 and S2O3-2 .Results of photodegradation study, Kinetics, effect of temperature, and effect of pH will be represented.