

Identification of the degradation pathways of alkanolamines with TiO₂ photocatalysis

麥富德

Lu CS;Chen CC;Mai FD;Li HK

摘要.

The present study deals with the photocatalytic degradation of the alkanolamine, 2-dimethylamino-2-methyl-1-propanol (DMAMP), in the presence of TiO₂ particles and UV-A ($\lambda=365$ nm) radiation. The obtained results show complete oxidation of DMAMP after 20h, and a little over 90% of DMAMP was mineralization after 64-h of treatment. The effects of the solution pH, catalyst loading, and anions on the photocatalytic degradation of DMAMP were investigated, as well as the reaction intermediates that were formed during treatment. To the best of our knowledge, this is the first time that reports the degradation pathways of DMAMP. A number of intermediates were identified by GC/MS techniques during the treatment of DMAMP, following three tentative degradation routes. The first one is based on the oxidation of the primary alcohol group leading to the formation of corresponding aldehyde and carboxylic acid. The second route is based on the rupture of the N-C bond to form 2-methylpropanal and acetone. The last degradation route is based on the cyclization of the beta-amino alcohol group to form the oxazolidine derivatives.