



## Photocatalytic degradation of wastewater containing acid red 1 dye by titanium dioxide: effect of calcination temperature

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### ABSTRACT

The effects of calcination temperature of titanium dioxide photocatalyst have been investigated on the photocatalytic degradation of an azo dye, acid red 1. The photocatalytic activity of the developed catalyst was greatly influenced by the mode of calcination. Photocatalysts subjected to high calcination temperatures (500°C) were not as effective as those calcined at lower temperature and those heat treated in a cyclic mode outperformed those which were calcined in a straight run. The photocatalysts developed were characterized by X-ray diffraction, Fourier transform infrared spectroscopy, surface scanning electron microscopy, and N<sub>2</sub> physisorption. Thus, it was found that the properties of the photocatalysts were significantly responsible for their photocatalytic activities.

*Keywords:* Calcination; Heat treatment; Titanium dioxide; Photocatalysts; Temperature; Dye

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