

## Abstract

The degradation properties of different organic dye solutions were systematically studied with the self-made network-like nano-ZnO under sunlight irradiation. The results show that the network-like nano-zinc oxide has a better degradation effect on weakly basic organic dye solution. This paper also compared the degradation performance of the self-made network nano-zinc oxide and nano dioxide on organic dyes, and the degradation effect of zinc oxide was obviously better than that of Cu dioxide. Nano-zinc powder with a regular shape was prepared by rolling vibration mill at room temperature by the dry method, and the zinc oxide nanocomposite structure was obtained by contacting with water vapor at 260 °C for hydrolysis and redox reaction. It is characterized by the coexistence of rod-like and bulk nanostructures, with good dispersibility, and the atomic ratio of oxygen and zinc is close to 2:3. This composite nanostructure was used for photocatalytic degradation of methyl orange solution, and the photocatalytic degradation performance of the ZnO nanocomposite structure was investigated under the irradiation of a 20W UV lamp at a distance of 40 cm. influences. In 50 mL of methyl orange solution with an initial concentration of 10 mg/L, adding 400 mg of zinc oxide nanocomposite structures generated by hydrolysis at 260 °C, the degradation rate can reach more than 80% within 10 min. The degradation properties of different organic dyes were systematically studied by using the self-made nano-ZnO under the conditions of an outdoor cloudy day, sunlight irradiation, and indoor UV lamp irradiation. The results showed that nano-ZnO had a better degradation effect on weakly basic organic dye solution under sunlight irradiation.

**Keywords:** Dyes, Degradation, Nanoparticles, Doped