



## Photocatalytic degradation of methylene blue dye by F-doped $\text{Co}_3\text{O}_4$ nanowires

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### ABSTRACT

The hydrothermal method was used to prepare  $\text{Co}_3\text{O}_4$  with different shapes by varying concentration of NaOH from 3 to 12 M. Shape of  $\text{Co}_3\text{O}_4$  was found to be nanowire by using 9 M NaOH. Fluorine was doped into the surface of  $\text{Co}_3\text{O}_4$  nanowire by impregnation method. Doping of fluorine into the surface of  $\text{Co}_3\text{O}_4$  nanowire decreases bandgap of  $\text{Co}_3\text{O}_4$  nanowire from 2.49 to 2.32 eV as a result of the blocking of some pores of  $\text{Co}_3\text{O}_4$  nanowire. The surface area of undoped  $\text{Co}_3\text{O}_4$  nanowire is higher than that of doped  $\text{Co}_3\text{O}_4$  nanowire. Doping of fluorine into surface of  $\text{Co}_3\text{O}_4$  nanowire enhances the photocatalytic performance of  $\text{Co}_3\text{O}_4$  nanowire toward degradation of methylene blue dye under visible light.

*Keywords:*  $\text{Co}_3\text{O}_4$ ; Hydrothermal; Fluorine; Methylene blue dye

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