Zinc oxide's hierarchical nanostructure and its photocatalytic properties

In this study, a new hierarchical nanostructure that consists of zinc oxide (ZnO) was produced by the electrospinning process followed by a hydrothermal technique. First, electrospinning of a colloidal solution that consisted of zinc nanoparticles, zinc acetate dihydrate and poly(vinyl alcohol) was performed to produce polymeric nanofibers embedding solid nanoparticles. Calcination of the obtained electrospun nanofiber mats in air at 500 °C for 90 minutes produced pure ZnO nanofibers with rough surfaces. The rough surface strongly enhanced outgrowing of ZnO nanobranches when a specific hydrothermal technique was used. Methylene blue dihydrate was used to check the photocatalytic ability of the produced nanostructures. The results indicated that the hierarchical nanostructure had a better performance than the other form.

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