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Effect of location and ionic interaction on photocatalytic activity of silver nanoparticles stabilized with polyDOPA

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ABSTRACT: PVA nanofibrous webs containing silver nanoparticles (Ag NPs) stabilized with poly(3,4-dihydroxyphenylalanine) (polyDOPA) were prepared using either the electrospinning or coating methods. The Ag NPs incorporated in the nanofibers were identified using SEM, TEM, TGA, and XRD. The catalytic reactions of the PVA nanofibrous webs containing the Ag NPs were compared using organic dyes under UV-Vis spectroscopy. The location (inside and outside) of the Ag NPs in the nanofibers and the charge interaction between the dye and the Ag NPs had a significant effect on the catalytic reaction rate. When the Ag NPs existed in the outside of the nanofiber due to the coating method, the reaction rate was increased due to the presence of more contact sites with respect to the organic dye. Also, an electrostatic attraction between the organic dye and the pDA surrounding the Ag NPs increased the catalytic reaction rate. Therefore, it was demonstrated that the location and the surface charge of the Ag NPs in the

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