

Analysis on $(\text{NH}_4)_2\text{SO}_4$ particle formation in dielectric barrier discharge – photocatalyst hybrid system

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The Dielectric barrier discharge – photocatalyst hybrid process was used for SO_2 removal and $(\text{NH}_4)_2\text{SO}_4$ particle formation. The cylinder-wire type reactor was filled with glass beads as dielectric materials. The glass beads were coated by TiO_2 photocatalysts using dip-coating method. The reactor has two zones: the first is for the SO_2 removal and the second, for ammonia particle $(\text{NH}_4)_2\text{SO}_4$ formation and growth. We analyzed SO_2 removal and particle growth for various process variables: applied peak voltage, initial SO_2 concentrations, and residence times. As the applied voltage and residence time increase or as the initial SO_2 concentration decreases, SO_2 removal efficiencies increase. As the initial SO_2 concentrations or residence time increase, the particles become bigger.