

Effects of Chromium Ion Doping on the Conduction Properties of TiO₂

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The conduction properties of Cr-doped and undoped polycrystalline TiO₂ powder are investigated. Rutile TiO₂ is doped by using the method of high temperature (900 °C) diffusion. Cr₂O₃ is used as the dopant precursor. Variation of electrical conductivity with temperature and dopant concentration is studied. Electronic conductivity of TiO₂ increases by four orders of magnitude and activation energy decreases by 60% as a result of doping. Both conductivity and activation energy depend on the dopant concentration. Highest conductivity and the lowest activation energy are obtained when the Cr₂O₃ concentration is about 5-6%.