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Construction of a database of processed remotely sensed data of waters around Sri Lanka

The effect of incorporation of chromium into the crystal structure of TiO_2 is studied by measuring the electrical conductivity. Predominantly rutile TiO_2 is doped by using the method of high temperature (900 ^oC) diffusion. Cr_2O_3 is used as the dopant precursor. Variations of AC and DC conductivities of the compressed pellets with the temperature are studied in the temperature range from 150 ^oC to 350 ^oC.

The conductivity of doped TiO_2, which is purely electronic, increases by three to four orders of magnitude. The temperature dependence is Arrhenius type, (~ 10^{-9} Ω^{-1} to ~ 10^{-5} Ω^{-1} cm^{-1} at 330 ^oC) in addition, unlike the previously studied dopant precursors, the conductivity varies with Cr2O3 concentration. The highest conductivity is obtained when the Cr2O3 concentration is about ~5 – 6%.

The activation energy of the doped sample, which is reduced significantly (by ~ 70%), as a result of doping, is in the range of 0.31 – 0.35 eV depending on the dopant concentration. Furthermore, it is very interesting to note activation energy varies with the dopant concentration within the above range and the lowest activation energy is

obtained when the conductivity is highest. The enhancement of conduction properties is due to the excess electrons, which contributes to the conduction band from the dopant.