

### Formation of Spherical Crystalline Mesoporous TiO<sub>2</sub> Particles by only Chemical Reaction without Calcination Process; Gel-Sol Method

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A thermally stable mesoporous spherical TiO<sub>2</sub> powders with a crystalline framework, high surface area, and large pores is synthesized by a novel and simple alkoxide gel-sol method using titanyl acylate gel [Ti(OiPr)<sub>4-x</sub>(OAc)<sub>x</sub>] as a precursor in 0.15N KOH solution. XRD analysis indicates that the anatase and rutile phase were formed pH range in 12-2 and in below 2, respectively, directly at reaction temperatures in the range 15-95 °C and atmospheric pressure without hydrothermal process and using the block copolymer. The synthesized anatase phase is stable up to calcination temperatures of 1000°C. The highest specific surface area (BET) obtained was 250 m<sup>2</sup>/g at the reaction temperature of 55°C. When the calcination temperatures increase, the adsorption - desorption isotherm shape, according to the BDDT classification progressively and continuously goes from a type IV isotherm, characteristic of mesopores (2nm < diameter < 50), to a type II isotherm, characteristic of macropores (diameter > 50nm).