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저온균일침전법에 의한 루타일 TiO_2 분말의 폴리아크릴산과의 분산 안정성
(Dispersion Stability of Rutile TiO_2 Powder Produced by Homogeneous Precipitation Process at Low Temperatures using Poly(arcylic acid))

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When oxide particles are dispersed in liquid medium, three major types of interactions will occur between the colloidal particles, viz. London and van der Waals attractive forces, Columbic repulsions between similarly charged particles, and then repulsive forces arising from solvation, adsorbed layers, etc. If the latter two forces are significantly higher than the attractive forces, a stable colloidal dispersion will be obtained. In order to strengthen the repulsive forces, surface charges can be created on the surfaces of particles or steric repulsions can be introduced by placing polymer chains on the surfaces of the particles.

The dispersion stability of rutile TiO_2 powder with rutile phase produced by homogeneous precipitation process at low temperatures (HPPLT) in the presence of poly(acrylic acid) (PAA) have been studied. The TiO_2 dispersion is prepared by introducing 2.5 ㎎ of HPPLTed TiO_2 powder in 250 ㎤ media. The dispersion was agitated by an ultrasonic device for an hour. The TiO_2 dispersion thus obtained was used in the subsequent preparation for samples under various pH conditions. After allowing sufficient conditioning time to attain equilibrium pH, the zeta potential of HPPLTed TiO_2 particles was measured as a function of pH, concentration and molecular weight of the polymer. An extreme sensitivity to pH and polymer concentration indicates the importance of influence on the stability of TiO_2 dispersions. And, adsorption of PAA on TiO_2 particles leads the zeta potential of the TiO_2 particle to become more negative.