

ABSTRACT OF THE INVENTION

METHOD AND SOLUTION FOR FORMING ANATASE TITANIUM DIOXIDE, AND TITANIUM DIOXIDE PARTICLES, COLLOIDAL DISPERSION AND FILM

[0072] A sol solution containing poly(titanic acid) and a planar heterocyclic ligand is provided. Titanium dioxide (TiO_2) particles are formed by aging the sol solution at a temperature below about 140 °C. The particles have metallocene-like Ti-complexes including the heterocyclic ligand and can be substantially in the anatase phase. The heterocyclic ligands can be triazole, tetrazole, or thiadiazole. The sol solution may be prepared by aging a precursor solution. The precursor solution may contain the heterocyclic ligands and a precursor for poly(titanic acid). The precursor may be titanium alkoxide or titanium chloride. The sol solution may also contain at least one of an organic acid, a base, and a surfactant. The aged sol solution may form a colloidal dispersion of the TiO_2 particles. A photo-catalytic and transparent film may be formed from the TiO_2 particles by depositing a layer of the colloidal dispersion on a support.