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(54) **Title:** ALUMINUM PHOSPHATE COMPOSITE MATERIALS AND COMPOSITIONS

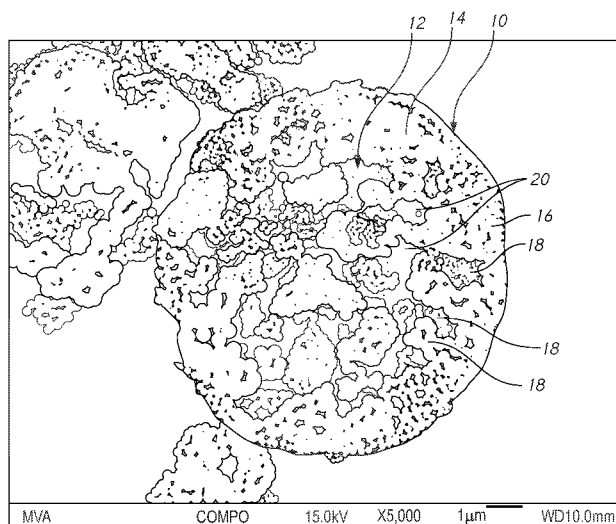


FIG. 1

(57) **Abstract:** AIP composite materials comprise an AIP aggregate core, and a shell disposed partially or entirely over the core and formed from a pigment material, e.g., TiO₂, having an index of refraction greater than the core, providing an overall index or refraction greater than the core and suited for use as a pigment replacement or extender. The AIP core comprises amorphous AIP, crystalline AIP, or a combination thereof, and can have an average particle size of less than about 30 microns. The TiO₂ can have an average grain size less than about 10 microns. The shell can have a layer thickness that is at least about 0.0001 microns. The shell is bonded to the core by a reaction between functional groups of the shell and core. The AIP composite material can be engineered to provide properties in addition to brightness for use as a pigment such as anticorrosion and/or antimicrobial protection.