a binding polymer, wherein the aluminum phosphate composite material is dispersed in the binding polymer.

[0005d] In another aspect of the present disclosure, there is provided a coating composition comprising:

a binder polymer material; and

an aluminum phosphate composite material dispersed in the binder polymer material, wherein the aluminum phosphate composite material comprises:

a plurality of cores comprising amorphous aluminum phosphate; and

a shell disposed at least partially over an outside surface of a respective core, the shell being formed from a material having an index of refraction greater than the core.

[0005e] In a further aspect of the present disclosure, there is provided a method for making an aluminum phosphate composite material comprising the steps of:

forming a dispersion of aluminum phosphate particles; ~~and~~

combining aluminum phosphate particles with a pigment material having an index of refraction greater than the aluminum phosphate particles so that the pigment material at least partially covers the aluminum phosphate particles to form the aluminum phosphate composite material; and

reacting the aluminum phosphate particles with the pigment material to form a reaction product there between.

[0006] In such example, the shell is provided in the form of a layer of pigment material disposed over an outside surface of the core. A preferred pigment material is TiO_2. The TiO_2 can have an average grain or powder size that is less than about 10 microns, in the range of from about 0.1 to 5 microns, and preferably in the range of from about 0.3 to 1 microns. The shell has a layer thickness that is at least about 0.0001 microns, and between about 0.001 to 2 microns, and preferably in the range of from about 0.01 to 1 microns. Generally, the shell layer thickness can comprise as little as a single grain, or can comprise several grains that are bonded or otherwise combined together on the core surface.

[0007] The shell may cover all or only a portion of the AlP core. In an example, the shell covers at least 20 percent of the total outside surface of the core, in the range of from about 30 to 100 percent of the total outside surface of the core, and preferably 20

an aluminum phosphate composite material dispersed in the binder polymer material, wherein the aluminum phosphate composite material comprises:

a plurality of cores comprising amorphous aluminum phosphate; and

a shell disposed at least partially over an outside surface of a respective core, the shell being formed from a material having an index of refraction greater than the core.

31. The coating composition as recited in claim 30 further comprising a pigment material.

32. The coating composition as recited in claim 31 wherein the aluminum phosphate composite material comprises at least 5 percent by weight of the total weight of the aluminum phosphate composite material and the pigment.

33. The coating composition as recited in claim 30 wherein the shell has an index of refraction that is greater than 2.

34. The coating composition as recited in claim 33 wherein the shell is formed from TiO_2.

35. The coating composition as recited in claim 30 wherein the aluminum phosphate composite material comprises a reaction product formed between pendant POH groups of the aluminum phosphate and a material from the TiO_2.

36. The coating composition as recited in claim 30 wherein the shell has a thickness in the range of from about 0.001 to 2 microns.

37. The coating composition as recited in claim 30 wherein the shell covers at least 20 percent of the total outside surface of a respective shell.

38. A method for making an aluminum phosphate composite material comprising the steps of:

forming a dispersion of aluminum phosphate particles; ~~and~~

combining aluminum phosphate particles with a pigment material having an index of refraction greater than the aluminum phosphate particles so that the pigment material at least partially covers the aluminum phosphate particles to form the aluminum phosphate composite material; and

reacting the aluminum phosphate particles with the pigment material to form a reaction product there between.

39. The method as recited in claim 38 wherein during the step of combining, the pigment material is TiO_2.

40. The method as recited in claim 38 further comprising after the step of combining, adding imidazole to the aluminum phosphate composite material.

~~41. The method as recited in claim 38 comprising reacting the aluminum phosphate particles with the pigment material to form a reaction product there between.~~

~~42~~41. The method as recited in claim ~~41~~ 38 wherein the pigment material is TiO_2.

~~43~~42. The method as recited in claim ~~41~~ 38 wherein during the step of reacting, POH groups from the aluminum phosphate particles react with a constituent of the pigment material.

~~44~~43. The method as recited in claim 38 wherein during the step of forming, aluminum trihydroxide is combined with phosphoric acid.