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(54) Title: ANTIMICROBIAL CHEMICAL COMPOSITIONS

(57) **Abstract:** Antimicrobial chemical compositions comprise an aluminum phosphate (AIP) solid dispersed within a binding polymer, wherein one or more bioactive materials are disposed within AIP forming a bioactive-AIP complex. The complex may comprise the bioactive material chemically bonded with the AIP, physically combined with the AIP, or a combination of both. The complex may be formed according to precipitation, condensation and sol-gel methods of forming. The complex is engineered to provide a controlled delivery of the bioactive material or a constituent thereof upon exposure to moisture to give a desired level of antimicrobial resistance to a film or composite formed from the composition of at least about 30 µg/m², and may also provide a desired degree of corrosion resistance through the release of passivating phosphate anion. Such antimicrobial chemical compositions provide an improved degree of active, long-term resistance to a broad range of micro-organisms when compared to known antimicrobial chemical compositions.



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