

Article abstract

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Silver-nanoparticle-embedded antimicrobial paints based on vegetable oil

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Developing bactericidal coatings using simple green chemical methods could be a promising route to potential environmentally friendly applications. Here, we describe an environmentally friendly chemical approach to synthesize metal-nanoparticle (MNP)-embedded paint, in a single step, from common household paint. The naturally occurring oxidative drying process in oils, involving free-radical exchange, was used as the fundamental mechanism for reducing metal salts and dispersing MNPs in the oil medium without the use of any external reducing or stabilizing agents. These well-dispersed MNP-in-oil dispersions can be used directly, akin to commercially available paints, on nearly all kinds of surface such as wood, glass, steel and different polymers. The surfaces coated with silver-nanoparticle paint showed excellent antimicrobial properties by killing both Gram-positive human pathogens (*Staphylococcus aureus*) and Gram-negative bacteria (*Escherichia coli*). The process we have developed here is quite general and can be applied in the synthesis of a variety of MNP-in-oil systems.

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