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Effects of solvents on the synthesis and infrared radiation emissivity of $CuFe_2O_4$ spinels

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Effects of solvents on the synthesis and infrared radiation emissivity of $CuFe_2O_4$ spinels

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Abstract: $CuFe_2O_4$ samples have been successfully prepared by hydrothermal/solvothermal method under various solvents. The structural, morphological, optical and infrared radiation properties have been systemically investigated by X-ray diffraction (XRD), scanning electron microscopy (SEM), transmission electron microscopy (TEM), UV-Vis-NIR absorption spectroscopy, Fourier transform infrared (FT-IR), Raman and IR-2 dual band emissivity measurement instruments. XRD analysis indicates the solvents have no effects on the crystal phase of $CuFe_2O_4$ samples but affects their purity. The SEM and TEM measurements reveal the microstructure of $CuFe_2O_4$ samples. UV-Vis-NIR absorption spectroscopy shows the influences of solvents on their optical absorption properties and band gaps. The excellent infrared radiation properties make them as the indispensable candidates in infrared heating, infrared coating and drying fields.

Keywords: $CuFe_2O_4$, Energy-saving, Infrared radiation, emissivity, Spinel ferrites.

1 Introduction

In recent years, the global energy shortage and environmental issues have become more and more serious with the fast development in modern society, economy and technology [1-3]. It is highly urgent to seek for a green and energy-saving route to meet the challenges of energy and sustainability. Infrared radiation, as a clean energy, is coming into the sights of researchers, and it is of the