

THERMAL PERFORMANCE OF BLACK CUPRIC OXIDE SUBMICRON-PARTICULATE COATINGS: EXPOSURE TEMPERATURE MEASUREMENT

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ABSTRACT. The objective of this study is to investigate the thermal performance of dark pigmented coatings that remain at low temperature while exposed to sunlight. The cupric oxide (CuO)-pigmented coating was optimized by a theoretical designing method. The radiative transfer in the pigmented coating was modeled using the radiation element method by ray emission model (REM2). The spectral reflectance was measured by spectroscopy in the visible (VIS) and near-infrared (NIR) regions. A black coating with high reflectance in the NIR region was developed. The temperatures of the designed coating and of the typical black and white paints were measured outdoors. The thin CuO coating on standard white paper with a moderate volume fraction of particles exhibited good thermal behavior while keeping its dark tone.