

ABSTRACT

Radiation-absorptive materials, suitable for fabrication into packages, sheets, inks, paints, decorative surface treatments, lotions, creams, and gels are disclosed. The materials exploit certain optical properties associated with uniform, spherical, nanosize particles to provide complete radiation absorption, over a selected bandwidth, at low concentration. One type of particle exhibits an "absorption edge" at a chosen wavelength, transmitting radiation whose wavelength exceeds the characteristic bandgap wavelength, while effectively absorbing all radiation with wavelengths smaller than that minimum. Another type of particle exhibits "optical resonance," which causes radiation of a characteristic wavelength to interact with the particles so as to produce self-reinforcing internal reflections that strongly enhance the amplitude of the radiation trapped within the particle.