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Optoelectronic Property Modeling of Cu Nanoparticles

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A three-dimensional (3D) electrodynamic model is implemented by using the finite-difference frequency domain (FDFD) to investigate the optical response of Cu nanoparticle packaging bed with Gaussian and Log-normally distributed under gravitational and Van der Waals forces. FDFD is applied to obtain the electromagnetic field distribution as a function of time and space by solving the Maxwell's equations, and thermal radiative properties such as effective absorption and extinction coefficient are measured. Geometric and wavelength dependences are investigated to understand the ability of tuning the sub-wavelength intensity and electric field enhancement. The electromagnetic coupling in the nanoparticle packings provides the possibility of creating the plasmonic polaritons and sintering quality of the particles can be enhanced by tuning the near-field radiation intensity enhancement.