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Silver nanoparticles as a potential solar absorber and the effect of UV-C irradiation during synthesis[1] BENJAMIN HARDY, FARIDA SELIM, Bowling Green State University, SELIM LAB TEAM — This work reports the possibility of developing Silver nanoparticles implanted into a polymer as a solar absorber. The plasmonic nature of the silver nanoparticle allows for adjustments to be made in its UV-VIS-NIR absorbance spectrum. A combination of different sized/shaped particles could result in ideal absorption of the majority of the solar spectrum. Allotting this with the stability of a polymer leads to potential solids or solutions that could work as a solar absorber. Tests were also performed to determine whether or not UV-C irradiation during synthesis affects the characteristics of silver nanoparticles, in particular the absorbance. Successful synthesis of Silver nanoparticles in solid form or as colloidal particles in a solution by using a strong reducing agent was achieved, with stabilization of the particles in a polymer material. By controlling the reactivity of the reducing agent used in the synthesis process, we are able to significantly affect the plasma frequency of the particles. UV-C light irradiation during synthesis led to relatively higher absorbance levels in both the solids and the colloidal particles. Silver nanoparticles with different plasmon frequencies combined with the effect of UV-C irradiation during synthesis have potential for solar absorbing technology.

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Benjamin Hardy
Bowling Green State University

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