

# About the relevance of particle shape and graphene oxide on the behavior of direct absorption solar collectors using metal based nanofluids under different radiation intensities

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© 2018 Elsevier Ltd Nanofluids based on spherical gold, silver, and copper nanoparticles, nonspherical silver nanoparticles, layered graphene oxides (GO), and GO/silver hybrid structures, were synthesized to analyze their effect on the thermal behavior of direct absorption solar collectors. The thermal conductivities at room temperature of all the nanofluids were similar, with values 4% higher than pure water, meaning up to three orders of magnitude differences compared to the values expected from the Maxwell model. Photothermal conversion experiments under simulated solar radiation with 1 Sun ( $=1 \text{ kW/m}^2$ ) of intensity showed that all the spherical metal nanofluids presented up to 5 K higher temperatures and 35% increase of the efficiencies than pure water after 3000 s of irradiation. A much larger effect was seen with nonspherical silver and GO/silver hybrid particles, as these nanofluids presented around 20% higher efficiencies than pure spherical silver nanofluids. The large effect of