Au-Water Nanofluid:  
Experimental Measurements and Numerical Simulation of the Yearly Yield  
of a Parabolic Trough Collector

Gianluca Coccia  
Department of Industrial Engineering and Mathematical Sciences, Marche Polytechnic University, Ancona,  
Italy

Laura Colla and Laura Fedele  
Construction Technologies Institute, National Research Council, Padova, Italy  
laura.colla@itc.cnr.it

Giovanni Di Nicola  
Department of Industrial Engineering and Mathematical Sciences, Marche Polytechnic University, Ancona,  
Italy

Antonella Barizza  
Construction Technologies Institute, National Research Council, Padova, Italy

In recent years, nanofluids, i.e. dispersions of solid particles into common fluids, have been studied to enhance the  
efficiency and performance of the solar thermal systems due to their enhanced thermophysical properties. In this  
work, thermal conductivity and dynamic viscosity of a water based gold nanofluid were measured and the  
nanoparticle stability was investigated. Experimental data were used as input for a numerical simulation to analyze  
the effects of nanofluids on the performance of a parabolic trough solar collector (PTC). Here, a direct comparison  
with the base fluid is provided in order to prove the convenience in the adoption of nanofluid as energy media.