

## عنوان مقاله:

Numerical and Experimental Investigations on the Effect of Adding Nanoparticles on Entropy Generation in PVT Systems

## محل انتشار:

هفدهمین کنفرانس دینامیک شاره ها (سال: 1396)

تعداد صفحات اصل مقاله: 12

## نویسندگان:

Arman Kolahan - Ferdowsi University of Mashhad

Seyed Reza Maadi - Ferdowsi University of Mashhad

Mohammad Passandideh-Fard - Ferdowsi University of Mashhad

Mohammad Sardarabadi - Ferdowsi University of Mashhad

## خلاصه مقاله:

In this study, the effects of adding nanoparticles on entropy generation are investigated using a 2D-transient numerical model validated with experimental measurements. The experiments were performed for various nanofluids ( $\text{Al}_2\text{O}_3/\text{water}$ ,  $\text{TiO}_2/\text{water}$  and  $\text{ZnO}/\text{water}$  by 0.2wt%, and  $\text{SiO}_2/\text{water}$  by 1wt% and 3wt%) on a PV system equipped with a serpentine collector tube to increase its efficiency. In order to simulate the PVT system, energy equations are solved for the entire plates and the tube flow using an implicit formulation. A good agreement is observed between model calculations and those of the measurements. For this comparison, mass flow rate, solar radiation, and inlet and ambient temperatures were kept constant. The effect of various metallic and metalloid nanofluids mass fractions on thermal (locally) and frictional fluid entropy generations, and the total entropy generation of the PVT system are investigated.  $\text{SiO}_2/\text{water}$  nanofluid is found to have the most entropy generation which is not favorable. For  $\text{Al}_2\text{O}_3/\text{water}$  nanofluid, the best performance in terms of thermal and total entropy generation is obtained. The  $\text{ZnO}/\text{water}$  nanofluid is also found to generate the least frictional entropy generation.

## کلمات کلیدی:

photovoltaic thermal system, nanofluid, thermal and frictional entropy generation, pressure drop

## لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/690900>

