

Joint Meet on  
29<sup>th</sup> International Conference on  
**Nanomedicine and Nanomaterials**  
&  
**24<sup>th</sup> World Nanotechnology Congress**  
April 26, 2021 | Webinar

## **Synthesis and Influence of Iron vanadium oxide nanoparticles in enhancing the thermal conductivity monoethylene glycol based nanofluids**

**Eman M Mostafa<sup>1</sup>, Sawzan Mahmoud<sup>1</sup>, Saad M Desouky<sup>1</sup>, Ahmed M Soliman<sup>2</sup> and M S A Abdel-Mottaleb<sup>3</sup>**

<sup>1</sup>Egyptian Petroleum Research Institute, PVT center, Ahmed El-Zomor st., 11727 Nasr City, Cairo, Egypt.

<sup>2</sup>Department of Engineering Sciences, Faculty of Petroleum and Mining Engineering, Suez University, 43721 Suez, Egypt.

<sup>3</sup>Lbs of Solar, Photochemistry and Computational Chemistry, Department of Chemistry, Faculty of Science, AIN Shams University, 11566, Abbassia, Cairo, Egypt

Nowadays, solar energy is considered as one of the most important sources of free, clean, and renewable energy with zero carbon dioxide emission. Solar energy collectors considered as a type of heat exchangers which transform solar thermal energy to solar thermal fluids. This paper interested in the application of the nanofluids in prototype flat plate solar collectors. For this purpose, iron vanadate oxide nanoparticle was prepared in one step by simple precipitate method at different pH- 3, 9 and 11. The prepared samples were investigated at 100°C or 500°C. The samples were characterized by X-ray diffraction (XRD), Nitrogen adsorption-desorption isotherm, Fourier Transform Infrared Spectroscopy (FTIR), Raman Spectroscopy, High Resolution Transmission Electron Microscopy (HRTEM), Thermo gravimetric analysis (TGA) and dynamic light scattering (DLS). The results showed the formation of mixed phases; Iron -vanadium oxide and hematite. The based ethylene glycol (EG) nanofluids were prepared using prolonged sonication. The prepared fluid was characterized by Rheological measurements and dynamic light scattering (DLS). Different factors affecting the stabilization of the nanofluid as the weight of nanomaterial, sonication time, sonication temperature and pH were also studied. To evaluate the thermal conductivity of the prepared nanofluid, two prototypes of flat plat collectors equipped with water storage tank were constructed to be used in the natural solar energy. The synthesized Iron-vanadium oxide nanoparticles at pH-9 showed high thermal conductivity behavior in flat plate collector in different weathering conditions. The thermal conductivity of prepared nanofluid could be improved to a maximum of 26.97%, in comparison with those of mono ethylene glycol and iron vanadium oxide iron oxide also, showed high stability more than three months. The results showed that nanofluid increase the efficiency of flat plat collector.

emymohamed2009@yahoo.com

### **Notes:**