Aquitaine –Karnataka collaboration
Scientific Project for Pre-PhD student exchange

Scientific Proposal

Project Title	**Nanocomposite Phase Change Materials for Solar Thermal Applications**	
Scientific domain	Energy System Engineering, Mechanical Engineering	
Summary (ca. 10 lines)	The phase change material (PCM) has gaining increasing attentions different heat storage materials in recent years among and it has great potential to play an important role in energy management. However, poor heat transfer performance is the common obstacle for most latent heat thermal energy storage systems due to the low thermal conductivity of the PCMs employed. In this proposed work, three nanocomposites phase change materials will be prepared and compared for latent heat thermal energy storage applications by using different nanomaterials, namely, Alumina Oxide, Titanium Oxide, graphene and graphite diffused with paraffin wax as PCM. The purpose of this work will evaluate and compare the heat transfer enhancement of selected nanocomposite PCM. The work will involves the charging and discharging performances of these different phase change nanocomposites are investigated and compared at the same working conditions using a simple experimental test unit for latent heat thermal energy storage. Also, the thermo physical properties of these nanocomposites PCM will be characterized and analyzed by a scanning electron microscopy (SEM) and a differential scanning calorimeter (DSC).	
Student profile wished	Mechanical Engineering, Renewable Energy, Electrical Engineering	
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Timing & duration for project (give approximate ranges)	From 3 to 6 month, any time of the year	
Selected References	TingXian Li, Ju-Hyuk Lee,, RuZhu Wang and Yong Tae Kang (2014) Heat transfer characteristics of phase change nanocomposite materials for thermal energy storage application, *International Journal of Heat and Mass Transfer* 75 (2014) 1–11. M.A. Kibria, M.R. Anisur, M.H. Mahfuz, R. Saidur and I.H.S.C. Metselaar, A review on thermophysical properties of nanoparticle dispersed phase change materials,Energy Conversion and Management 95 (2015) 69–89.	

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