



DESIGN AND FABRICATION OF SOLAR HEAT CELL USING PHASE CHANGE MATERIALS

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ABSTRACT

Thermal comfort as well as lower cooling and heating loads are need of the world today. Various studies has shown that thermal energy storage (TES) is a way to accomplish this goal. Our aim in this study is to store heat energy in a cylinder (called cell) from the sun light and to use the stored heat in absence of sunlight for cooking and other heating purposes. Estimates are made for designing a cell, capable of storing heat from sunlight, required to boil a cup of water. Focused sunlight is used to charge the cell from sunlight. The focused light is produced by focusing plate. The cell is kept at the focal point of focusing plate. After some time the cell stores this heat by specific type of materials inside it. These materials are called phase change materials (PCM). Initially PCM heat up by concentrated beam of sunlight and store sensible heat. When the temperature of PCM reach its melting point, it start melting and store latent heat energy. At this stage, PCM contain both sensible and latent heat energy. The PCM, upon cooling, provides this energy with minor heat losses. The cell, keeping PCM, is well insulated and could store heat for 8 hours after charging. Beside this, smaller heat cells are also designed for use in insulated stove. So heat is stored by cells at the day time and could be used at the night time for heating and cooking purposes.

KEYWORDS: *Renewable Energy, Phase change Materials, Solar heat Cell, Thermal Energy, Latent Heat, Sensible Heat*