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Phase Change Properties of Adipic Acid-sebacic Acid Binary Mixtures

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Extended Abstract

Phase change material (PCMs) are utilized in many applications including waste heat recovery, solar heating, and load levelling for power generation (Zalba et al.,2003). PCM used in Latent heat thermal energy storage (LHTES) has attracted much attention in different solar energy heating and cooling applications because of its ability to exhibit a high storage density at nearly isothermal conditions (Karaipekli and Sarı, 2009). The storage of thermal energy in the temperatures range 100-180 °C has a high economic potential, especially for the application of solar energy for industrial processes and the utilization of waste heat(Web-1). Over the past several decades**,** inorganic compounds, organic compounds, and their eutectic mixtures as PCMS have been studied with respect to their thermophysical properties and utility potential for LHTES (Chen et al., 2009, Sari et al., 2011). The mixture of Adipic acid-sebacic acid were investigated whether it could be used as PCM material. For this aim binary mixtures were prepared at various ratios. By heating process, the mixture was converted to liquid form. The mixture was thoroughly stirred. After solidification process by cooling, thermal properties such as melting temperature, freezing temperature and latent heats were obtained by Differential Scanning Calorimetry. The extrapolated onset temperature (T_o), peak temperature (T_p), and extrapolated end temperature (T_e) were determined using the freezing curves of the PCM. The eutectic freezing temperature was obtained to be 98.25 °C for AA–AA in the combination ratio of 48.0:52.0 wt.%. Eutectic mixture has a latent heat of fusion of 179.7 J/g. It can be reported that the latent heat of the eutectic mixture of AA-SA are relatively high compared to other PCMs such as salt hydrates and polyalcohols (Abhat, 1983; Garg 1985; Zalba et al.,2003; Kaygusuz, 1999; Sarı, 2006).

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