A series of poly(methylmethacrylate-co-2-hydroxyethylacrylate)/n-octadecane (P(MMA-co-2HEA)/C18) and poly(methylmethacrylate-co-2-hydroxyethylacrylate)/n-eicosane (PMMA-co-2HEA)/C20) microcapsules were prepared by an emulsion polymerization method as microencapsulated phase change materials (MEPCMs). The structural identification was done by using FTIR spectroscopy and thermal properties of the hydrophilic monomer incorporated microcapsules were investigated using Differential Scanning Calorimetry (DSC) and Thermogravimetric analysis (TGA) techniques. The surface morphology and particle size of MEPCMs were studied using a Polarised Optical Microscope (POM) and a Particle Size Analyzer (PSA). DSC and TGA techniques indicated that the microcapsules containing highest amount of the n-alkane had a latent heat of 125 J/g and high thermal stability. The particle size and distribution showed the microcapsules had uniform size and distribution. It was confirmed by FTIR spectroscopy that the poly(methylmethacrylate-co-2-hydroxyethylacrylate) shell was successfully synthesized onto the surface of the paraffin core. The results also showed that the thermo-physical properties were strongly dependent on the content of the microcapsules.