In this study, a series of microencapsulated phase change materials (PCMs) with poly(methyl methacrylate-co-methacrylic acid) P(MMA-co-MAA) shell and n-octadecane or n-eicosane core were synthesized by emulsion polymerization method. The aim was to produce microencapsulated n-alkanes having functional groups on their outer surface, so that functional groups would help increasing physical interactions between microcapsules and fiber surface. Therefore methyl methacrylate (MMA), ethylene glycoldimethacrylate (EGDM), and methacrylic acid (MAA) were copolymerized in oil phase of n-alkane. FT-IR results proved the successful synthesis of P(MMA-co-MAA) shell of microencapsulated n-alkanes. The DSC results indicated that the microencapsulated n-alkanes have considerable latent heat storage capacity in a range of 58 - 145 J/g. The average melting and freezing temperatures of the microencapsulated n-alkanes were measured as 27 and 26 °C for n-octadecane and 36 and 35 °C for n-eicosane, respectively. The microcapsules had spherical and compact shape with particle sizes between 15 µm and 32 µm. The microcapsules on the cotton fabric applied by pad–dry–cure method were found highly durable and they showed sufficient stability upon several washings and rub fastness. Thermo-regulating properties of the fabrics were declared as a result of thermal history measurements.