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The synthesis of PNIPAAm-coated thermoresponsive textile via emulsion polymerization**Songmin Shang and Ka Lok Chiu**

Hong Kong Polytechnic University, Hong Kong

A series of semi-interpenetrating polymer network (semi-IPN) hydrogel based on poly (vinyl alcohol) (PVA) and poly (N-isopropylacrylamide) (PNIPAAm) were prepared by emulsion polymerization. There were 5 samples composed of different amount of initiators and catalysts for emulsion polymerization. The changes of particle sizes of each hydrogel were monitored at temperatures 30°C, 35°C 40°C and 45°C respectively. The optimal hydrogel was coated onto cotton fabrics and then the coated fabrics were investigated by swelling experiment, scanning electron microscope (SEM) and Fourier transform infrared (FTIR) spectroscopy. The thermo-behavior of the semi-IPN hydrogel is observed. Experimental data indicates the amount of initiators and catalysts added is an influential factor for the formation of optimal hydrogels while the concentration of hydrogel is not. The coated fabric is able to change the swelling ratio by 10.1% at the Lower Critical Solution Temperature (~35°C), which means the fabric is sensitive to the change of temperature. SEM results indicate that the semi-IPN hydrogel affects the surface appearance of the cotton fabric. Further confirmation of chemical structure is completed by FTIR spectroscopy.

shang.songmin@polyu.edu.hk