Session #

#

SYNTHESIS OF POLYURETHANE-UREA MICROCPASULES WITH PERFUME FOR TEXTILE APPLICATION

Sofia N. Rodrigues, Isabel M. Martins, Filomena Barreiro, Vera Mata and Alírio E. Rodrigues, LSRE – Laboratory of Separation and Reaction Engineering, Department of Chemical Engineering, Faculty of Engineering of University of Porto, Rua Dr Roberto Frias s/n, 4200-465 Porto, Portugal. Correspondence concerning this abstract should be addressed to Sofia Rodrigues with e-mail address: csofia@fe.up.pt

This work is a contribution to the introduction of emergent technologies in the textile sector, namely the microencapsulation of fragrances and its application to obtain added-value products. Polyurethane/urea (PUU) microcapsules with a perfume have been produced using the interfacial polymerization technology for industrial application on textile substrate having in view man suits production.

The majority of the available commercial microencapsulated fragrance systems for textile applications are based on formaldehyde systems (phenol-formaldehyde or melamine-formaldehyde resins), which are facing under the present environmental policies, several restrictions. In such context, the production of PUU microcapsules using the interfacial polymerization technology was performed as these systems appear as more attractive environmental friendly solution. Moreover, they are known as versatile polymer systems which can be tailor-made from a wide range of raw materials in order achieve the desired physical chemical and mechanical properties. The only drawback is that PUU systems must be designed and optimized taking into consideration the particularities of the active principle to be encapsulated. The extent of reaction of PUU microcapsules formation was followed by Fourier Transform Infrared Spectroscopy. Size distribution and morphology of the produced microcapsules were studied using particle size analysis, optical microscopy and scanning electron microscopy. The microcapsules mean size (based on volume distribution) of produced microcapsules is 10 μm and thickness around 1μm. Impregnation on textile substrates was tested both at laboratory level and at industrial scale. The fragrance release from textile substrates was measured with headspace chromatography. The content of microcapsules was released with light abrasion to simulate day-to-day wear, and fabrics impregnated at laboratory scale have survived to 9000 abrasion cycles. Microcapsules have continued to release aroma up to 5 dry cleaning washing cycles. The encapsulation efficiency and the presence of perfume on textile substrate were quantified through GC-FID-Headspace analysis. The encapsulation efficiency accounts for 55% of the loaded perfume used in the encapsulation process. Comparing each component of the perfume with their odor threshold the results showed that musk and limonene scent odor values are the highest so these are the components that we smell more. The amount of limonene component in the fabric was compared with its threshold and the odor value was calculated confirming that there is a decrease on odor value with 5 dry cleaning cycles.

Name: Sofia Rodrigues
Organization: LSRE – Laboratory of Separation and Reaction Engineering, Department of Chemical Engineering, Faculty of Engineering of University of Porto
Street Address: Rua Dr. Roberto Frias s/n
City, State, Zip/Postal Code: 4200-465 Porto
Country: Portugal
E-mail address: csofia@fe.up.pt
Telephone: +351 225 081 577
Fax: +351 225 081 674