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TOPIC(s) : Renewable carbon / Catalytic systems

Surfactants from renewables

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PURPOSE OF THE ABSTRACT

In this talk new alternatives to gain surfactants will be presented using terpenes as a versatile renewable feedstock.

Figure 1: surfactant structure

Surfactants need a hydrophilic part and a hydrophobic part. In a lot of economic applications the hydrophobic part is made from fatty acids. These linear carboxylic acids are linked by ester groups or amide bonds to polar amines or alcohols like dimethylamine or sugars. The most prominent example of these surfactants is the nonionic APGs (Alkyl polyglycoside) from fatty acids and glucose.

In the presented approach homogeneous catalyzed reactions are used to merge hydrophilic amines to hydrophobic terpenes. Reaction schemes like the hydroaminomethylation were employed to form amine bonds in yields up to 80%. Applied to the terpenes like α -myrcene and amines like diethylamine the reaction gives versatile surfactant precursors (figure 2).

Figure 2 Hydroaminomethylation of α -myrcene and diethylamine

These precursors were methylated to yield quaternary amines in order to measure the characteristics of these new renewable based surface active molecules. The myrcene-diethylamine hydroaminomethylation product showed good cmc and surface tension values and remarkably low foaming activity (figure 3).

Figure 3: foaming properties of the new surfactant from terpenes

FIGURES

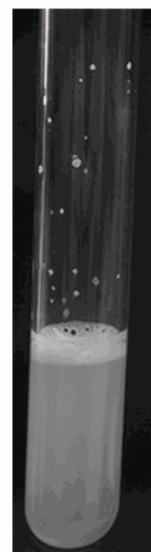
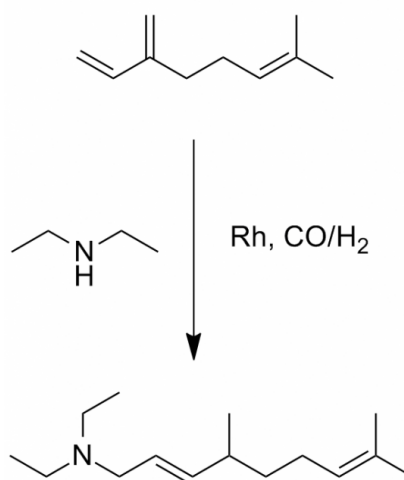
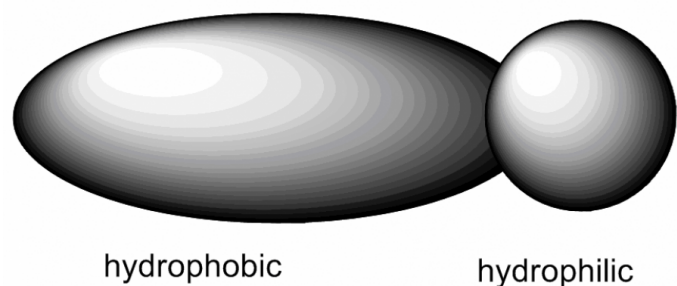


FIGURE 1

surfactant structure
surfactant structure

FIGURE 2

fig 2
Hydroaminomethylation of α -myrene and diethylamine (left); foaming properties of the new surfactant from terpenes (right)

KEYWORDS

homogeneous catalysis | Recycling | renewables | surfactants

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