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Cascade (dithio)carbonate ring opening reactions for self-blowing Polyhydroxythiourethane foams

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PURPOSE OF THE ABSTRACT

Polyurethane (PU) foams are nowadays common polymers used in various domains such as insulation or mattresses. Due to the growing concern about the environmental impact of isocyanates, greener routes are actively studied. Polyhydroxyurethanes (PHU) have been developed in order to produce isocyanate-free polyurethane thermosets.1 Nevertheless, to replace PU foams, a gas production is required in order to blown the foam. Thus, different routes have been developed to blow PHU; such as the reaction amine-polymethylhydroxysiloxane or the use of low boiling point liquids.2,3 Such strategies suffer from different drawbacks (flammable gases or the price of the blowing agent). Recently, Monie et al. presented a PHU foam blown using the Pearson reaction e.g. the reaction of a thiol with cyclocarbonate to produce CO2.4 In this work, we present a new strategy in order to produce CO2 through a cascade reaction. Indeed the gas production is induced by the formation of thiol in situ from the ring opening of dithiocarbonate monomers by an amine. Owing to this original way of blowing, different foams have been synthesized and characterized in order to determine the influence of different additives on morphologies and properties.

FIGURES

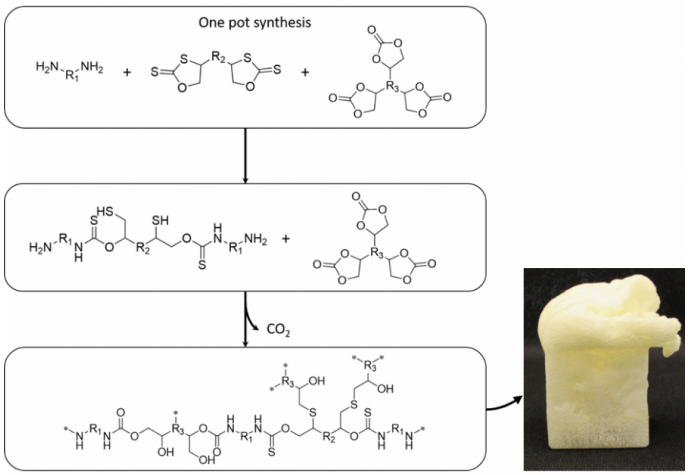

FIGURE 1
General scheme

The cascade reaction to synthesized the NIPU foams.

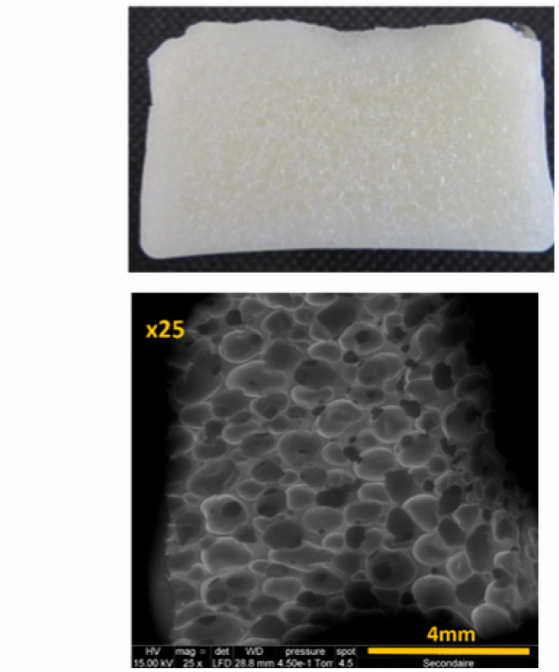

FIGURE 2
Foam pictures

Picture a foam obtained using this new route of blowing.

KEYWORDS
Foam | Non Isocyanate PolyUrethane | Chemical Blowing Agent | Polyhydroxyurethane

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