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Synthesis of new polyurethanes from biomass-derived diols

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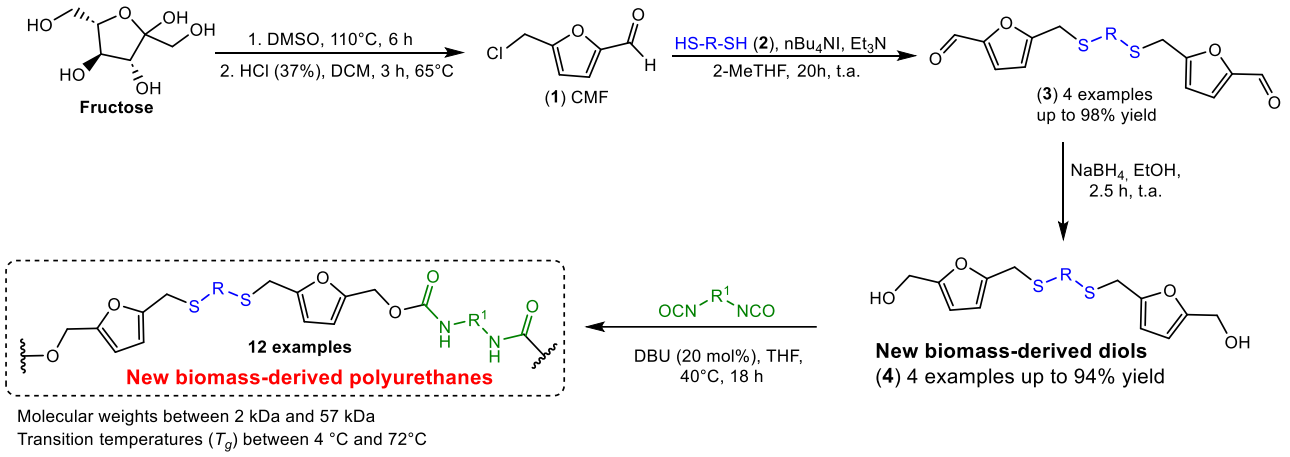
ABSTRACT

Polyurethanes represent an interesting class of polymeric materials with extensive potential for various applications. They are industrially produced through the polyaddition reaction between diols and diisocyanates, primarily derived from petrochemical sources.[1,2] There has been a growing interest in developing new polymeric materials from biomass-derived molecular platforms, such as 5-(chloromethyl)furfural (CMF).[3,4] The work presented herein showcases the synthesis of new polyurethanes by the reaction between biomass-derived diols (**4**) and commercially available diisocyanates using an organic base as the catalyst (Scheme 1). Initially, we explored the synthesis of new dialdehydes (**3**) through the substitution reaction between CMF (**1**, obtained from fructose) and dithiols (**2**). Different reaction conditions were tested, resulting in the desired products (**3**) in moderate to excellent yields (up to 98%). These dialdehydes were then reduced using sodium borohydride to produce the corresponding diols, which were used to synthesize new biomass-derived polyurethanes.



Scheme 1. The synthetic pathway utilized to produce new polyurethanes derived from biomass.

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