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Utilising CO_2 as feedstock for polymer production

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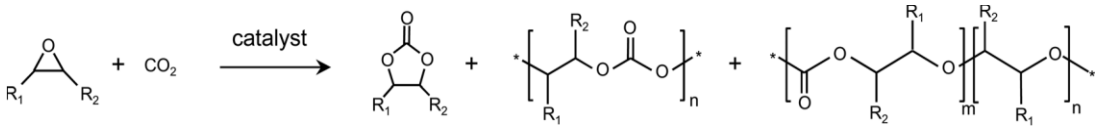
Abstract:

CO_2 is an abundant, renewable, non-toxic and inexpensive carbon feedstock that can be converted to value added chemicals and materials. The selective transformation of CO_2 into polymers in the catalytic copolymerization with epoxides has been known for decades. One such polymer is poly(propylene carbonate) (PPC), an amorphous, aliphatic polymer with 43 wt % CO_2 incorporated in a perfectly alternating copolymer chain. The CO_2 content of the polymer chain backbone is tunable which is reflected in enriched ether content hence in tunable polymer properties. Formation of ether linkages in the polymer backbone and/or the formation of side products depend on the catalyst and process conditions. Norner develops viable process technology and polymer application opportunities to unlock the potential of PPC in various relevant applications, thereby enabling the future use of waste CO_2 as a building block in future plastics packaging and other application areas. PPC can be combined with a range of other materials and holds potential within plastics packaging and a range of other application areas.



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Dr. Fredriksen has a PhD in organic chemistry from the University of Oslo, Norway, for work in synthesis and complexation studies of macrocyclic polyethers. Currently, she holds a position as Advisor in Green Technology in Norner, a Global market leader of Industrial R&D Services in Polymers based in Norway. Dr. Fredriksen has more than 20 years of industrial experience in the polymer industry, notably in catalysis and polymerization. Her current interests and responsibilities focus on the development of sustainable polymer solutions for plastics in the circular economy, including the use of CO_2 as feedstock to produce novel polymers.