

Carbon dioxide: A raw material for textile industry

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Recently, several technologies have been developed to use CO₂ as raw material in polymer synthesis, indicating CO₂ as a valuable raw material for polymer industry. One of these technologies, the production of polyether polyols, has been industrialized 3 years ago in a demonstration plant with a production capacity of about 5,000 tons per year. CO₂-based polyether polyols found a platform for a broad range of applications such as flexible foams for mattresses or binders for sports flooring.

Polyurethane-based elastic fibres are another application for CO₂-based polyether polyols. CO₂-based polyether polyols are utilized to produce thermoplastic polyurethane (CO₂-based TPUs). A melt spinning process has been successfully developed for CO₂-based TPUs by a research team at Institut für Textiltechnik of RWTH Aachen University (ITA, Aachen) and filaments with variable properties have been developed for a broad spectrum of applications. These filaments have been investigated thoroughly to optimize their properties and to adjust the spinning process. In a joint project, a team of researchers from Covestro and ITA, Aachen, has mapped the process chain from raw material to textile demonstrators in cooperation with other industrial partners from textile industry. The results of polymer and filament development are summarized in a number of publications, student theses and a PhD thesis.

The presentation gives an overview of polymer and textile processing of CO₂-based TPU.