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Extraction of Polymer Melts with Supercritical CO₂

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When thermoplastics should be recycled, the extraction of additives, fillers and other contaminations out of the polymer is very important for further processing of the regranulate. The extraction of contaminations with supercritical fluids becomes more and more important to the plastics industry. Especially the extraction with supercritical CO₂ (scCO₂) is very attractive due to its favourable physical and chemical properties in the supercritical state. In former examinations at the IKV, the technical feasibility of an extraction of monomers and oligomers from polyamide with scCO₂ has been examined on a co-rotating, intermeshing twin screw extruder. Due to the high surface renewal, a high concentration gradient exists between contaminations within the polymer melt and scCO₂. This leads to a highly effective diffusion process, and thus the monomer amount in polyamide could be reduced. In a new project, in cooperation with Deutsches Wollforschungsinstitut (DWI) at RWTH Aachen University, Coperion Werner & Pfleiderer GmbH & Co. KG, Stuttgart and Gimpel Ingenieur-Gesellschaft mbH, Aachen, the technical feasibility of a continuous extraction of contaminations, contained in postconsumer diesel fuel containers in a co-rotating, intermeshing twin screw extruder, is investigated.