CreaSolv® Process

Brominated flame retardants (‘BFRs‘) are removed from waste plastics by the CreaSolv® process. Specific polymers in the waste plastics are selectively dissolved by proprietary solvents and then precipitated by another proprietary formulation. This follows pre-separation of other wastes so that the feed materiál entering the solvent extraction contains a high proportion (generally ≥75 %) of the type of plastic to be recovered (Malcolm Richard, 2011). The developers – CreaCycle GmbH, in co-operation with the Fraunhofer Institute IVV – report that the

volume of solvent used is very small in relation to the treated plastic (<1 %), because the solvents are recycled. The only solvent removed from the process is the small fraction in which BFRs and other contaminants are separated and concentrated.

The final products of the proces are usable polymer recyclate, BFR-rich concentrate, and, if present, a metals-rich

insoluble fraction (Creacycle; Mäurer and Schlummer, 2004). The process has been applied at laboratory

and pilot plant scales. For example, after battery removal, post-consumer mobile phones were treated, yielding

polymer particles suitable for extrusion and injection molding processes (Mäurer and Schlummer, 2004). In another example, expanded polystyrene (PS) waste was successfully treated at pilot scale to produce re-expandable PS that is comparable to virgin polystyrene in usability (Mäurer and Knauf, 2005). In a small-scale feasibility study, both BFRs and PBDD/Fs, which were present as co-contaminants, were successfully removed from plastic wastes from Canadian WEEE dismantling plants (Schlummer et al, 2008). The Waste and Resources Action Programme (WRAP) funded a study by Freer (2005) to assess the potential environmental impacts of four new processes for recovering electrical and electronic plastic waste containing BFRs in comparison to landfill and incineration with and without energy recovery. Among these, the CreaSolv® Process was ranked best with respect to energy consumption and photochemical oxidation potential, and was second only to incineration with energy recovery in having the lowest global warming potential.

The study concluded that the two solvent-based processes, CreaSolv® and Centrevap® were the two best environmentally performing processes and also noted that the CreaSolv® Process was particularly distinguished

by “low solvent losses and high solvent recovery efficiencies.“ A recent review by Nnorom and

Osibanjo (2008) of the management of BFR-containing plastics noted that other WRAP-funded studies found the

Creasolv® Process to perform better in removing BFRs from WEEE polymers than the Centrevap® process. However both processes were said to provide financially viable alternatives to landfill and incineration

as options in the management of WEEE plastics. The reviewers concluded that these solvent-based methods of

removing BFRs “presently offer the best commercial and environmental option in the sound management of waste BFRcontaining plastics,” and went on to suggest that commercialization of these processes will help to reduce export of WEEE wastes to developing countries. The concentrated BFRs recovered from the process can be destroyed by other non-combustion technologies or irreversibly transformed as reagents in industrial processes (IPEN Dioxin PCBs and Waste Working Group 2010).

References:

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