

Trial Results Reveal New Extraction Processes For Additives Will Encourage WEEE Plastics Recycling

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Separation and treatment to remove additives from waste electrical and electronic equipment (WEEE) can be more commercially and environmentally beneficial than landfill, incineration with energy recovery, export for recycling outside the UK or feedstock recycling options.

These are the results of new research investigating the waste management options for mixed WEEE polymers, released today by WRAP (Waste & Resources Action Programme).

During the research, two new brominated flame retardant (BFR) extraction methods were trialled with the conclusion that BFR polymer treatment processes could potentially be commercially available within the next four years.

The European WEEE Directive encourages closed loop recycling by electronics manufacturers. WRAP has identified that one of the barriers to closed loop recycling of polymers from WEEE is the need to remove unwanted additives before they can be re-used. One of the most common additives are BFRs, some of which are known to give off harmful dioxins during reprocessing.

The three phase project, commissioned by WRAP and carried out by Axion Recycling Ltd, undertook a number of practical trials and process design work and looked at techniques to separate and remove BFRs from mixed WEEE polymers. The project trialled two different extraction methods: Creasolv¹ and Centrevap². Separation and sorting techniques for WEEE polymers and BFR treatment processes were also researched and tested.

Paul Davidson, Plastics Technology Manager at WRAP, comments: “There is an increasing need to respond to the issue of removing BFRs. This project is a pre-emptive move to create a workable, commercially viable solution for industry before the problem becomes acute. The separation methods trialled are a major step forward in the area of WEEE plastic recycling. The development of a feasible treatment process will help to encourage increased recycling of WEEE polymers and divert waste from landfill.”

The trial results revealed that while Creasolv is more successful at removing BFR from WEEE polymers, both provide financially viable alternatives to landfill and incineration. Centrevap does not remove the same level of BFR content as Creasolv, but was successful at removing other insoluble impurities from a wide range of polymer types.

“In order to find a total process solution, every element including the treatment process and the impact of transporting of materials has been taken into account. Combining the best features of the Centrevap and Creasolv processes has potential to produce a process which can remove not only the majority of BFRs but also the majority of other fine particulate contaminants,” adds Paul Davidson.

The new methods provide a substantially better financial and environmental option for producing new high grade polymer. Both processes consume less than 20% of the primary energy used in the virgin polymer production process.

Although further development is required, it is believed that BFR polymer treatment processes could be deployed commercially throughout the UK in as little as two to four years. WRAP and Fraunhofer IVV have entered into a technology sharing agreement which will make the Creasolv process technology available for license in the UK via WRAP.

¹ Creasolv was initially created by the Fraunhofer Group but has been further developed by WRAP throughout this project. As a result, WRAP now has the right to license Creasolv plants in the UK. ² Centrevap has been solely developed by WRAP and tested at a technical scale.

Editor's Notes:

1. WRAP works in partnership to encourage and enable businesses and consumers to be more efficient in their use of materials and recycle more things more often. This helps to minimise landfill, reduce carbon emissions and improve our environment.
2. Established as a not-for-profit company in 2000, WRAP is backed by Government funding from Defra and the devolved administrations in Scotland, Wales and Northern Ireland.
3. Working in seven key areas (Construction, Retail, Manufacturing, Organics, Business Growth, Behavioural Change, and Local Authority Support), WRAP's work focuses on market development and support to drive forward recycling and materials resource efficiency within these sectors, as well as wider communications and awareness activities including the multi-media national Recycle Now campaign for England.
4. WRAP established the Manufacturing team in April 2006 to maximise the amount and quality of recyclate used by UK manufacturing operations. In WRAP's 2006-2008 Business Plan, the Manufacturing team's aim is to secure an additional 220,000 tonnes a year of increased use of recyclate by the UK manufacturing sector.
5. More information on all of WRAP's programmes can be found at www.wrap.org.uk

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