Application of jig separator to recycle plastics used in electrical appliances

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Abstract

Development of mechanical separation of different plastics is essential in planning and constructing a recycling plant that processes scrapped office and home appliances. The authors have developed a plastic separator using a TACUB jig. Jig separation for plastics of smaller sizes (0.5-2 mm) but similar specific gravities was performed using polyvinyl chloride (PVC) and polyethylene (PE) from scrap electric wires. High-grade PE and PVC products over 99.8% were obtained under pulsation of smaller frequency and amplitude than that for coarser plastics. For the plastics from scrap copying machines containing polystyrene (PS), acrylonitrile butadiene styrene (ABS), and polyethylene terephthalate (PET), high grades (>99%) of each plastic were recovered in the two cells of the jig, where PET, is recovered from the first cell as a bottom product, and ABS and PS from the second cell as bottom and upper layer products, respectively. Their sizes ranged from 3.5-10mm and their specific gravities were 1.03, 1.22 and 1.71 for PS, ABS, and PET respectively. Based on the results, a recycling plant for processing scrap office and home appliances had been constructed.
This means that producers of Electrical and Electronic Equipment (EEE) will now have to finance the end-of-life recycling and recovery costs of all their products. As a result, in order to bring about long-term financial savings, original equipment manufacturers (OEMs) are likely to introduce design changes to their products and plastic producers will have to adapt to these changes. Among the many repercussions of the design changes will be a gradual reduction of the variety of plastics used in EEE products. A wider range of plastics makes the recycling process difficult and expensive due to...

Plastics are ubiquitous and there are 7 types which are normally recyclable and identifiable by an imprinted code. There are at least 10 more plastics used in the home which you may not be aware of. Casings of electronic/electrical devices and appliances - Originally made from wood, metal or Bakelite, they are now generally made from polystyrene, polypropylene or ABS. Fixtures and fittings in homes - Lighting, electrical fittings and bathroom fittings. Unlike scrap metals for instance which are more valuable, it is such a ubiquitous and cheap material that there has been very little incentive to recycle it until recent decades. Bakelite This is a thermosetting plastic, used in the past for electrical fittings, electrical insulation, door knobs and saucepan handles. Plastic recycling is the process of recovering scrap or waste plastic and reprocessing the material into useful products. Since the vast majority of plastic is non-biodegradable, recycling is a part of global efforts to reduce plastic in the waste stream, especially the approximately 8 million tons of waste plastic that enters the Earth's ocean every year.