

Dear Mr. or Mrs,

From a background in recycling of WEEE and ELV I would like to contribute the following information and considerations related to the RoHS stakeholder consultation related to Diantimony trioxide:

- Performed research in the framework of the Next Level Plastic recycling project funded by the Flemish government has demonstrated that: It is technically feasible to sort out plastic components based on the presence of bromine and antimony and to mechanically recycle these plastics maintaining both good mechanical and flame retardant properties. Ongoing analysis are currently investigating the presence of deca brominated flame retardants in the waste stream of LCD TV plastics for which a pilot line to sort these plastics on a component level has recently been implemented. We expect that separating brominated flame retardant plastics that are pop listed from non pop listed will not be technically feasible during recycling, the only possibility we see is to separate specific waste fractions that only recently emerged and in which no or only limited amounts of pops are used, such as flat screens.
- To my knowledge the only alternative additives for bromine/antimony based flame retardant to achieve the by European legislation required UL 94 V0 requirement for plastic housings in LCD TVs and other EEE are phosphor based. As phosphor is also in the list of CRM the impact of the ban of Antimony on the availability of resources to achieve flame retardant properties for plastics needs to be considered.
- Today's state of the art recycling processes in Europe make either or both use of x-ray fluorescent based optical sorting and/or density based sink-float sorting techniques after size reduction by shredding. With post-shredder sorting techniques plastics containing bromine/antimony based flame retardants can be separated with a high efficiency from other non-flame retardant plastic types, as the density is significantly higher and the bromine content is sufficient for good detection by xrf. However, with these techniques it is today not economically viable to separate bromine/antimony containing plastics for mechanical recycling, as further sorting of these plastics to obtain the required purity is not possible post-shredder, as no techniques exist to sort for example ABS BrFR and HIPS BrFr post shredder. It should also be considered that the same issues are valid for phosphor based flame retardant plastics, which can also not be sorted out post shredded with the required purity for mechanical recycling for high end applications. Moreover, it is not possible to detect the relatively low amount of phosphor (lighter element than bromine) with XRF, so the only technique possible post shredder to separate these flame retardant plastics from non-flame retardant plastics that is commonly used is

density based sorting with sink float. Therefore, common practice is the incineration with energy recovery of all different types of flame retardant plastics. Ongoing research at the KU Leuven also investigates the recycling of antimony from the ashes of these incinerated plastics, but this is to my knowledge not common practice today.

Of course, we are open to further support your project both in the framework of the Flemish NLPR project and in the framework of the European H2020 PolyCe project (in cooperation with among others IZM Fraunhofer)

Best Regards,

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