

Supplementary materials:

**Micro-XRF analysis results regarding the Br content
assessment on the validation set**

In this document the results of micro-XRF analysis regarding the Br content assessment on the validation set used in the HSI procedure (3.4. *Identification of WEEE plastics with brominated flame retardants*) are reported.

The analysis was performed using a portable X-ray fluorescence (XRF) device, specifically the Niton™ XL2 by Thermo Fisher Scientific Inc. (Waltham, MA, USA). This device features a silver anode X-ray tube with adjustable voltage (6-45 kV), current (1-200 uA), and maximum power output of 2 W.

The micro-XRF map of Br (Figure S1) shows a high concentration and distribution of this element according to the large use of BFRs inside on WEEE plastic waste.

The source images of plastic scraps sample (Low Br and High Br) adopted to define the validation dataset are reported in Figure S2. The Br content (mg/kg) evaluated by micro-XRF analysis for each sample and sample characteristics are reported in Table S1.

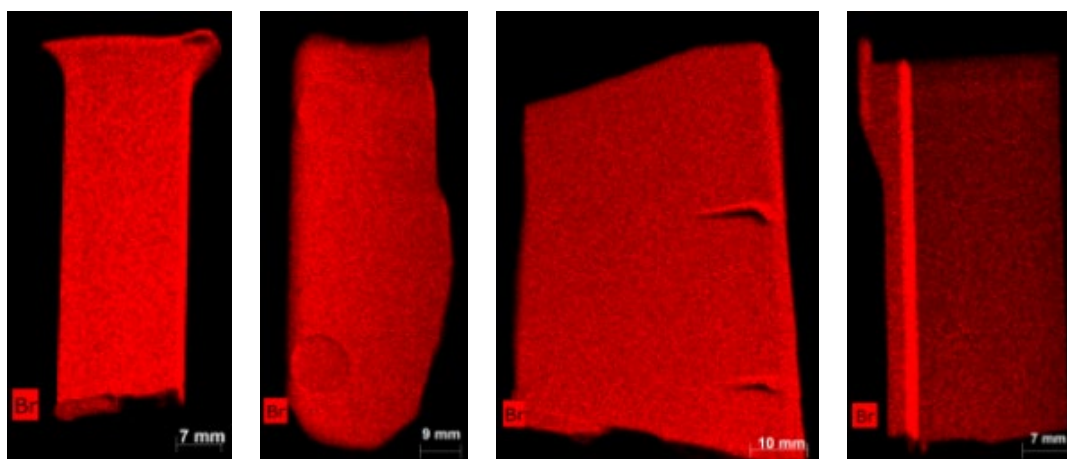


Figure S1. Examples of the Micro-XRF distribution maps for Br inside on plastic waste samples.

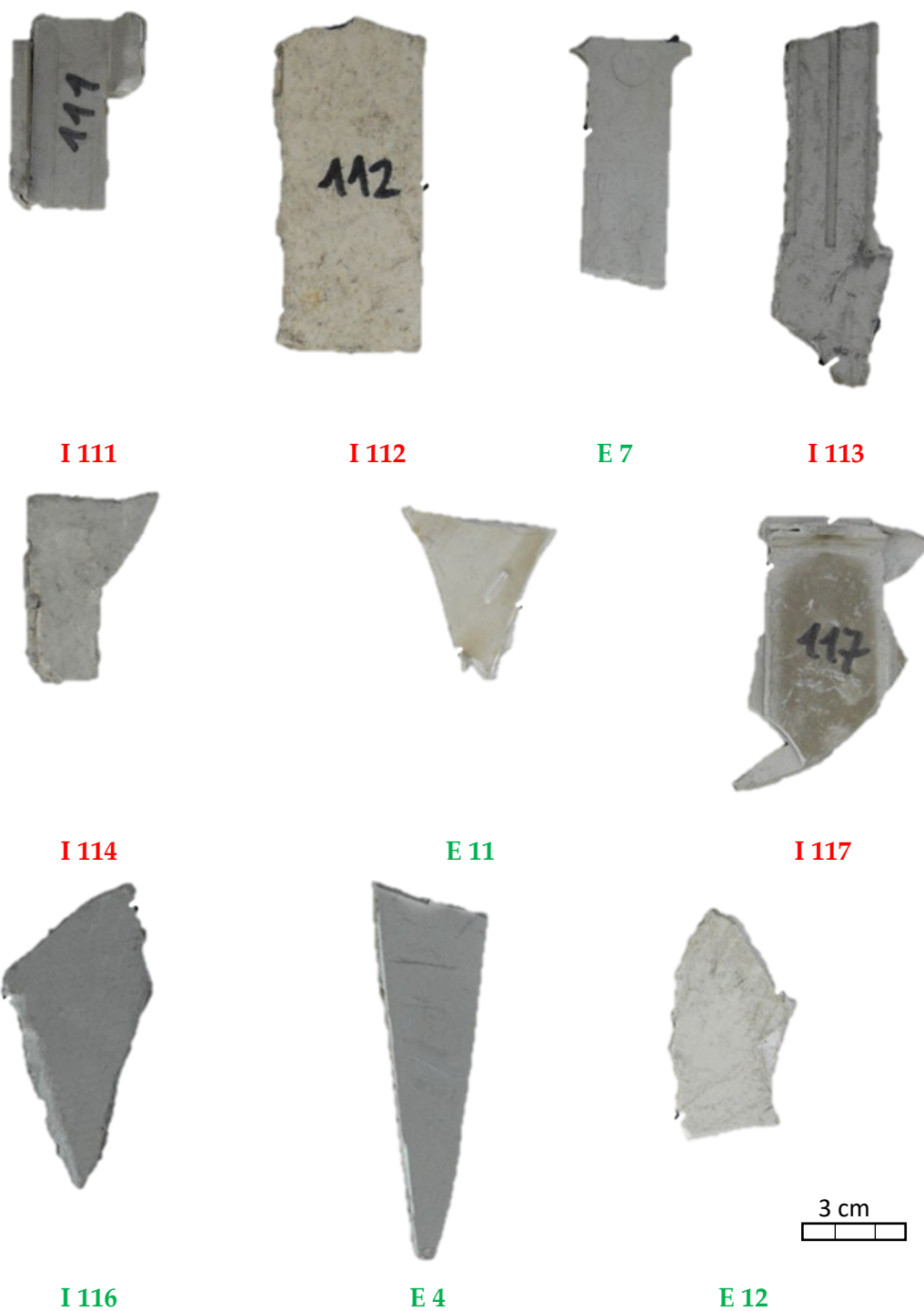




Figure S2. Source images of plastic scraps sample (**Low Br** and **High Br**) adopted to define the validation dataset.

Table S1. Main characteristics of waste plastics samples with different content of Brominated flame retardant utilized for validation.

ID	Color	Weight (g)	Br (mg/kg)
I 111	Grey	3.87	3.41
I 11	Grey	4.5	3.69
I 114	Grey	2.62	4.02
I 20	Grey	2.45	4.55
I 21	Grey	5.05	4.93
I 15	Grey	2.59	5.21
I 4	White	6.15	5.52
I 12	Grey	5.4	5.72
I 18	Grey	3.56	6.04
I 19	Grey	2.88	8.42
I 112	Grey	8.26	8.83
I 113	Grey	5.07	11.95
I 117	Grey	6.43	76.5
E 20	Grey	20.46	27200
E 4	Grey	4.2	27600
I 13	Grey	7.84	37500
I 116	Grey	4.22	41300
E 2	White	26.26	60800
E 11	White	3.33	61000
E 17	White	6.66	82300
E 12	White	4.18	82500
E 7	Grey	5.41	123100