

Separation of Hazardous Brominated Plastics from Waste Plastics by Froth Flotation after Surface Modification with Mild Heat-Treatment

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Abstract : This study evaluated to facilitate separation of ABS plastics from other waste plastics by froth flotation after surface hydrophilization of ABS with heat treatment. The mild heat treatment at 100°C for 60s could selectively increase the hydrophilicity of the ABS plastics surface (i.e., ABS contact angle decreased from 79° to 65.8°) among other plastics mixture. The SEM and XPS results of plastic samples sufficiently supported the increase in hydrophilic functional groups and decrease contact angle on ABS surface, after heat treatment. As a result of the froth flotation (at mixing speed 150 rpm and airflow rate 0.3 L/min) after heat treatment, about 85% of ABS was selectively separated from other heavy plastics with 100% of purity. The effect of optimum treatment condition and detailed mechanism onto separation efficiency in the froth flotation was also investigated. This research is successful in giving a simple, effective, and inexpensive method for ABS separation from waste plastics.

Keywords : ABS, hydrophilic, heat treatment, froth flotation, contact angle

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