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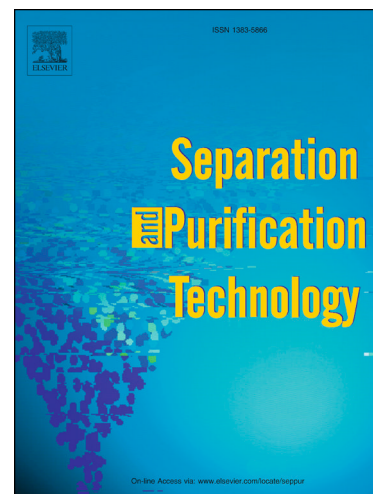
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Separation of polyvinylchloride (PVC), polystyrene (PS) and polyethylene terephthalate (PET) granules using various chemical agents by flotation technique

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ABSTRACT

A mixture of traditional virgin (unused) plastics ordinarily available in municipal wastes, polyvinylchloride (PVC), polystyrene (PS) and polyethylene terephthalate (PET) was treated with several chemical agents, i.e., polyvinyl alcohol (PVA), polyethylene glycol (PEG), methyl cellulose (MC), tannic acid (TA) and methyl isobutyl carbinol (MIBC), individually or combine with each other. The effects of various parameters on the floatability of the used plastics, namely, chemical agent type and concentration, conditioning temperature and time and liquid media pH, were studied and the results were discussed. It revealed that in most experiments, the PET sustained the least flotation change for the studied chemical agents and was sunk at the bottom of the flotation tank. The TA was useful on the PVC flotation through surface adsorption and changing the PVC surface hydrophobic behavior in different ways depending on the TA concentration. With the PET exception, the increasing temperature improved floatability of the studied plastics for used chemical agents. The raising the pH of the liquid media changed the floatability of the studied plastics in different ways depending on the pH value and the used chemical agent. In most cases, the increasing conditioning time was beneficial to the plastic flotation up to 15 minutes. As an essential conclusion, the PVC and PS could be separated from PET in their mixture by using TA-PEG with 0.2-0.8 ratio and TA-PEG with equal ratio plus 2ml/L MIBC in two stages completely. The comparison of the results with other studies showed the shape and size of the used plastics were crucial factors on the separation of the studied plastics by the flotation technique.

Keywords: Recycling, plastic, flotation, chemical conditioning, separation, municipal waste

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