

Levitasi Magnetik untuk Pemisahan Plastik Polyethylene Terephthalate (PET) dan Polyvinyl Chloride (PVC)

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ABSTRAK

Dalam daur ulang sampah plastik, proses pemisahan mengalami permasalahan dengan sulitnya plastik jenis PET dipisahkan dengan plastik jenis PVC. Penelitian ini bertujuan untuk memisahkan campuran plastik PET dan PVC dengan menggunakan metode levitasi magnetik. Dalam eksperimen, digunakan sampel campuran plastik jenis PET dan PVC yang berasal dari botol bekas kemasan yang ada dipasaran. Sumber medan magnet berasal dari susunan magnet-magnet permanen berbahan Neodimium berbentuk silinder dengan orientasi arah momen magnet sejajar garis sumbunya. Magnet-magnet disusun sehingga menghasilkan gradien medan magnet pada arah vertikal. Induksi magnet pada masing-masing permukaan magnet adalah 0,244, 0,349, 0,412, 0,443, 0,463, dan 0,476 T. Fluida paramagnetik yang digunakan adalah berupa larutan $MnCl_2$ dengan konsentrasi 1, 1,5, 2, 2,5, dan 3 M. Hasil menunjukkan pada B_0 sebesar 0,476 T, fluida dengan konsentrasi 3 M menghasilkan levitasi tertinggi serta pemisahan terbaik plastik PET dan PVC.

Kata kunci: Pemisahan, plastik PET, plastik PVC, levitasi magnetik, induksi magnet, konsentrasi fluida.

ABSTRACT

In the recycling of plastic waste, the process of plastic separation is often faced with the problem of the difficulty of separating PET from PVC plastics. The main objective of this research was to separate a mixed PET and PVC plastics using magnetic levitation. In the experiment, the samples were PET and PVC plastics from used bottles packaging found in the market. The magnetic field was derived from arrangement of the permanent magnets made from Neodymium with a cylinder shape with an orientation of magnetic moment parallel to its axis. Magnets were arranged so as to produce a magnetic field gradient in the vertical direction. The magnetic inductions at the respective surface of each magnet were 0,244, 0,349, 0,412, 0,443, 0,463, and 0,476 T. The paramagnetic fluid used was solution of $MnCl_2$ with a concentration of 1, 1,5, 2, 2,5, and 3 M. The results showed that at B_0 of 0,476 T, the fluid with the concentration of 3 M produced the highest levitation and the best separation of PET from PVC plastics.

Key word: separation, PET plastic, PVC plastic, magnetic levitation, magnetic induction, fluid concentration.

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