

## Pengaruh penambahan nanopartikel $Fe_3O_4$ pada sifat shape memory polyurethane = Effect nanoparticles $Fe_3O_4$ addition in shape memory polyurethane properties / Masrudin

Masrudin, author

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### Abstrak

#### <b>ABSTRAK</b><br>

Shape Memory Polyurethane (SMPU) telah disintesis dari penambahan polyethylene glycol (PEG-6000) sebagai segmen lunak dan 4,4'-Methylenebis (Cyclohexyl isocyanate) (HMDI) sebagai segmen keras serta 1,1,1-Trimethylol propane (TMP) sebagai chain extender. SMPU lalu ditambahkan nanopartikel  $Fe_3O_4$  berukuran 20-50 nm untuk meningkatkan sifat kemagnetan. Untuk mengkonfirmasi bentuk ikatan antarmuka komposit SMPU digunakan FTIR (Fourier Transform Infrared Spectroscopy). FE-SEM digunakan untuk mengetahui interface dari filler dan matriks SMPU. Konfirmasi nilai kemagnetan menggunakan VSM (vibrating sampel magnetometer) dan pengujian tarik menggunakan microtensile menunjukkan bahwa penambahan  $Fe_3O_4$  dengan persentase 11 wt% menghasilkan nilai kemagnetan dan sifat mekanik tertinggi.

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#### <b>ABSTRACT</b><br>

Shape Memory Polyurethane (SMPU) has been synthesized by reacting polyethylene glycol (PEG-6000) as softsegment, 4,4'-Methylenebis (Cyclohexyl isocyanate) (HMDI) as hardsegment and 1,1,1-Trimethylol propane (TMP) as chain extender. SMPU was added by  $Fe_3O_4$  as filler to provide magnetical property. Magnetite which had confirmed by Scanning Elctron Magnetic (SEM) have size 20-50 nm. Functional group was investigated by FTIR (Fourier Transform Infrared Spectroscopy). The magnetic behavior of the nanocomposites was observed by vibrating sample margnetometer (VSM). FE-SEM is used to acknowledge interface between filler and Shape Memory Polyurethane (SMPU) matrix. Mechanical properties tested by microtensile testing showed adding 11%  $Fe_3O_4$  obtaining magnetic and nanocomposites SMPU resulted in improved materials with higher magnetical and mechanical properties.