

ABSTRAK

SINTESIS PDMS-co-PMHS DAN KARAKTERISASINYA

Polimer silikon atau polisiloksan merupakan suatu bahan kimia yang terbentuk dari unit molekul-molekul kecil dengan ikatan rantai utamanya berupa ikatan atom silikon dan oksigen (...-O-Si-O-...) secara berulang. Polisiloksan dapat bertahan dalam waktu yang lama, mudah diproduksi, tahan panas dan stabil terhadap reaksi kimia dengan senyawa lain, sehingga polimer silikon ini banyak diproduksi secara komersial dan diaplikasikan ke berbagai bidang, seperti industri otomotif, konstruksi, energi, elektronik, tekstil hingga penerapan kebidang medis. PDMS-co-PMHS ini merupakan salah satu dari jenis senyawa polisiloksan yang berhasil disintesis melalui hidrolisis dari diklorodimetilsilan (DCMS) dengan diklorometilsilan (DCHS) untuk menghasilkan monomernya, kemudian dilakukan proses kondensasi untuk mendapatkan polimer PDMS-co-PMHS. Sintesis dilakukan sebanyak empat kali yaitu dengan variasi sampel PDMS-co-PMHS 1:1, PDMS-co-PMHS 1:3, PDMS-co-PMHS 1:3 tanpa KOH $\frac{3}{4}$ resep, PDMS-co-PMHS dengan KOH $\frac{3}{4}$ resep. Pada sampel PDMS-co-PMHS 1:1 dan PDMS-co-PMHS 1:3 dilakukan purifikasi untuk menghilangkan sisa pelarut dan katalis KOH. Semua sampel telah membentuk polimer PDMS-co-PMHS dengan nilai rendemen sebesar berturut-turut 62,81%, 59,4%, 53,56%, 53,68%. Hasil karakterisasi viskositas dari masing-masing sampel PDMS-co-PMHS 1:1, PDMS-co-PMHS 1:3, PDMS-co-PMHS 1:3 tanpa KOH $\frac{3}{4}$ resep, PDMS-co-PMHS 1:3 dengan KOH $\frac{3}{4}$ resep yaitu sebesar 1,58 Pa.s, 1,33 Pa.s, 0,62 Pa.s, 0,73 Pa.s. Hasil pengukuran nilai indeks bias sebesar 1,3986, 1,3989, 1,3989, 1,3978. Hasil pengukuran tegangan permukaan sebesar 21 mN/m, 22 mN/m, 19,5 mN/m, 19,5 mN/m. Hasil pengukuran nilai massa jenis sebesar 0,87 g/mL, 0,92 g/mL, 0,96 g/mL, 0,91 g/mL.

Kata-kata kunci: polisiloksan; hidrolisis; kondensasi; kopolimer; diklorometilsilan; diklorodimetilsilan; poli(dimetilsiloksan-co-metilhidrosiloksan).

ABSTRACT

PDMS-co-PMHS SYNTHESIS AND CHARACTERIZATION

Silicon polymer or polysiloxane is a chemical that is formed from units of small molecules with the main chain bonds in the form of repeated bonds of silicon and oxygen atoms (...-O-Si-O-...). Polysiloxane can last a long time, is easy to produce, heat resistant and stable to chemical reactions with other compounds, this silicone polymer is widely produced commercially and applied to various fields, such as the automotive industry, construction, energy, electronics, textiles to medical applications. PDMS-co-PMHS is one of the types of polysiloxane compounds that was successfully synthesized through hydrolysis of dichlorodimethylsilane (DCMS) with dichloromethylsilane (DCHS) to produce monomer, then a condensation process was carried out to obtain PDMS-co-PMHS polymer. The synthesis was carried out four times, with sample variations of PDMS-co-PMHS 1:1, PDMS-co-PMHS 1:3, PDMS-co-PMHS 1:3 without KOH $\frac{3}{4}$ prescription, PDMS-co-PMHS with KOH $\frac{3}{4}$ prescription. The samples of PDMS-co-PMHS 1:1 and PDMS-co-PMHS 1:3 were purified to remove the remaining solvent and KOH catalyst. All samples have formed PDMS-co-PMHS polymer with yield values of 62.81%, 59.4%, 53.56%, 53.68%, respectively. The results of the viscosity characterization of each sample PDMS-co-PMHS 1:1, PDMS-co-PMHS 1:3, PDMS-co-PMHS 1:3 without KOH $\frac{3}{4}$ prescription, PDMS-co-PMHS 1:3 with KOH $\frac{3}{4}$ prescription are 1.58 Pa.s, 1.33 Pa.s, 0.62 Pa.s, 0.73 Pa.s. The results of the measurement of the refractive index value are 1.3986, 1.3989, 1.3989, 1.3978. The results of surface tension measurements are 21 mN/m, 22 mN/m, 19.5 mN/m, 19.5 mN/m. The results of the measurement of density values were 0.87 g/mL, 0.92 g/mL, 0.96 g/mL, 0.91 g/mL.

Keywords: polysiloxane; hydrolysis; condensation; copolymer; dichloromethylsilane; dichlorodimethylsilane; poly(dimethylsiloxane-co-methylhydrosiloxane).