عنوان مقاله:

Fabrication and investigation of permeability and selectivity of polyaniline membrane

محل انتشار:

کنفرانس بین المللی فرآورش پلیمرها (سال: 1390)

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خلاصه مقاله:

The membrane gas separation is a very safe, low cost and efficient approach for separation of many petrochemical gasses. Polyaniline (PANi) is a conducting polymer and the dense membranes made from this polymer have excellent selectivity for binary gas mixtures such as O2/N2 and CO2/CH4 [1]. The molecular spacing and free volumes of polyaniline chains can be controlled by its interesting doping/undoping chemistry [2]. The sufficient difference between molecular sizes of these gases allow desired selectivity in gas separation (CO2 (3.23Å), O2 (2.92 Å), N2 (3.64 Å), and CH4 (3.8 Å)) [3].In this research, PANi was first synthesized from aniline in presence of HCl and ammonium peroxodisulfate (APS) according to MacDiarmid approach [4]. The undoping process was carried out using NH4OH solution 1M. The PANi films were then prepared by casting solution method using N-methylpyrrolidinone (NMP) as solvent. The structure of synthesized polyaniline has been characterized by Fourier Transform Infrared Spectroscopy (FTIR). The molecular weight of synthesized polymer has been determined (117767g/mol) by Cannon-Fenske viscometer using Mark-Houwink-Sakurada equation.The permeability of prepared as-cast and undoped membranes at 80°C, have been successfully determined for CO2 (1.39 and1.56), O2 (0.4 and 0.47), N2 (0.056 and 0.05), and CH4 (0.04 and 0.034). The selectivities of O2/N2 and CO2/CH4 gas pairs were 7.14 and 34.75, respectively for as-cast film; and 9.4 and 45.88, respectively for undoped film. This means that undoping process can enhance the .selectivity of PANi membrane significantly

کلمات کلیدی:

Polyaniline, membrane, gas separation, CO2/CH4, O2/N2