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Pengaruh penambahan multi-walled carbon nanotube terhadap karakteristik pelat bipolar komposit polymer electrolyte membrane fuel cell(PEMFC)

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Abstrak

ABSTRAK
Polymer Electrolyte Membrane Fuel Cell (PEMFC) merupakan salah satu energy alternative untuk mengatasi keterbatasan energi fosil, serta ramah lingkungan. Pelat bipolar merupakan komponen penting pada PEMFC sebagai pengumpul dan pentransfer elektron dari anoda menuju katoda. Pada penelitian ini pelat bipolar dibuat dari grafit komposit yang terdiri dari matriks grafit Electric Arc Furnace (EAF), carbon black dan multi-walled carbon nanotube sebagai filler, dan resin epoksi sebagai binder. Bahasan utama penelitian ini ialah pengaruh penambahan multi-walled carbon nanotube yaitu sebanyak 1%, 2%, 3%, 4% dan 5% terhadap konduktivitas karakteristik material pelat bipolar. Karakterisasi pelat bipolar dengan melakukan beberapa pengujian yaitu uji konduktivitas, uji flexural, uji densitas, uji porositas dan pengamatan dengan menggunakan FE SEM. Hasil dari peneltian ini, penambahan multi-walled carbon nanotube pelat bipolar dapat meningkatkan sifat konduktivitas hingga menjadi 8.95 S/Cm dan kekuatan flexural bipolar yaitu sebesar 59.11 Mpa. Namun, penambahan multi-walled carbon nanotube memiliki titik optimum pada penambahan 3%, penambahan multi-walled carbon nanotube diatas 3% dapat menurunkan kembali sifat konduktivitas dan flexural pelat bipolar akibat penggumpalan atau aglomerat dari multi-walled carbon nanotube
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Abstract
Polymer Electrolyte Membrane Fuel Cell (PEMFC) is one of the alternative energy to overcome the limitations of fossil energy, as well as environmental friendly. Bipolar plate in PEMFC is an important component as collector and transferor o f electron from anode to cathode. In this research the bipolar plate is made from graphite composite consisting of Electric Arc Furnace (EAF) graphite as matrice, carbon black and multi-walled carbon nanotube as filler, and opxy resin and hardener as binder. The main subject of this research is effect of addition multi-walled carbon nanotube that is as much as 1%, 2%, 3%, 4% and 5% to the characteristics of bipolar plate. Characterization of bipolar plate by doing some testing iare conductivity test, flexural test, density test, porosity test, and observation with FE SEM. Result from this research is addition of multiwalled carbon nanotube can improve the conductivity to be 8.95 S/cm and flexural properties of bipolar plate is 59.11 Mpa. However, the excessive addition of multiwalled carbon nanotube has an optimum point on the addition 3%, the

addition multi-walled carbon nanotube over can return decreace the conductivity and flexural properties of bipolar plate because there is agglomeration multiwalled carbon nanotube.