Studi karakteristik komposit karbon batubara/arang batok kelapa ukuran 200 mesh dengan matriks Coal Tar Pitch = Study of characteristic carbon-carbon composite coal/coconut shell coal mesh size 200 with coal tar pitch matrix

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Abstrak

Komposit karbon dibuat dengan bahan baku serbuk limbah batubara, arang batok kelapa, dan coal tar pitch. Serbuk batubara dan arang batok kelapa berperan sebagai penguat partikulat, dan coal tar pitch berperan sebagai prekursor matriks pengikat. Persentase coal tar pitch yang digunakan adalah 30% berat dan persentase BB dan ABK 70% berat. Ukuran partikel batubara dan arang batok kelapa yang dipakai adalah 200 mesh. Pembuatan komposit ini dilakukan dengan proses kompaksi panas dengan tekanan 11 U.S ton/78 Mpa, T=1000C, selama 30 menit, kemudian dikarbonisasi pada suhu 500-5500C, P = ± 600 torr. Variabel dalam penelitian ini adalah persentase BB:ABK yaitu 60:40, 70:30, 80:20. Pada spesimen uji komposit karbon ini akan diamati nilai densitas, persentase porositas, nilai kekerasan, ketahanan aus dan morfologi ikatan antar bahan penyusun.
Semakin tinggi kandungan BB(semakin rendah kandungan ABK) akan dihasilkan nilai densitas yang semakin tinggi dan porositas semakin rendah. Nilai densitas tertinggi terdapat pada rasio komposisi BB:ABK 70:30, yaitu 1,53 gr/cm3 dan persentase porositas terendah terdapat pada 70:30, yaitu 32 %. Kemudian, semakin tinggi kandungan ABK (atau semakin rendah kandungan BB) akan dihasilkan nilai kekerasan yang semakin tinggi dan laju keausan akan semakin rendah/semakin tahan aus. Nilai kekerasan tertinggi terdapat pada BB:ABK 60:40, yaitu 49,73 BHN dan laju keausan terendah terdapat pada BB:ABK 60:40, yaitu 0.05499 mm3/Nm. Ketidaksesuaian densitas, porositas, serta laju keausan pada rasio komposisi BB:ABK 80:20 disebabkan karena banyaknya coal tar pitch yang meluber saat kompaksi.
.....Carbon-carbon composite is made by coal,coconut shell coal, and coal tar pitch. Coal and coconut shell coal acted as reinforced particle and coal tar pitch as matrix precursor. The percentage of coal tar pitch which used is 30% (weight fraction) and reinforced particle(coal and coconut shell coal) is 70%. The mesh of particle size of coal and coconut shell coal is 200. The processed used is hot compaction/pressing. The pressed was 11 U.Ston/78 Mpa, T=1000C, for 30 minute, Then carbonized at 500-5500C, P = ± 600 torr. The variable in this research is the presentage of coal compared with coconut shell coal,individually 60:40, 70:30,and 80:20.The carbon-carbon composite then characterized enclose density, the percentage of porosity, hardness, wear rate, and microstructure by Scanning Electron Microscope (SEM).
With increasing of coal content(decrease of coconut shell coal content),produced the increasing in density and decreasing in porosity. The highest density is shown in composition ratio of coal compared with coconut shell coal 70:30, that was 1,53 gr/cm3 and the lowest percentage of porosity is produced in 70:30, that was 32 %. Then, increasing of coconut shell coal content (decrease of coal content) produced higher proportion in hardness and lower proportion in wear rate/ more wear resistant. The highest proportion in hardness is produced in composition ratio of coal compared with coconut shell coal 60:40, that was 49,73 BHN and the lowest wear rate is shown in composition ratio of coal compared with coconut shell coal 60:40, that was 0.05499 mm3/Nm. The nonconformity in density, porosity, and wear rate in composition ratio of coal

compared with coconut shell coal caused by the amount of coal tar pitch reduced (caused overflow from the dies) when hot pressing carried out.