

BAB 5

KESIMPULAN DAN SARAN

5.1 Kesimpulan

Dalam penelitian ini, CNT dari biomassa sebagai *support* katalis Pt telah difungsionalisasikan dengan menggunakan dua campuran asam, yaitu HNO_3 dan H_2SO_4 , serta campuran HCl dan H_2O . Karakterisasi dengan menggunakan TGA telah menunjukkan keberhasilan dispersi Pt pada CNT hingga 45% dan 35% pada sampel Pt/CNT-1 dan Pt/CNT-2. Selain itu, perbandingan dari spektrum CNT murni dengan CNT yang telah difungsionalisasi menunjukkan adanya perubahan puncak *fingerprint* pada CNT yang telah difungsionalisasi dan yang belum difungsionalisasi karena CNT yang digunakan dalam penelitian ini merupakan CNT yang terbuat dari biomassa. Puncak XRD juga telah menunjukkan pembentukan struktur kristal dari Pt pada CNT. Meskipun pada analisis *in-situ* pada *fuel cell*, Pt/CNT menunjukkan OCV yang lebih rendah dari Pt/C komersial. Namun, transportasi massa yang lebih baik telah diamati pada Pt/CNT.

5.2 Saran

Dari hasil penelitian yang telah dilakukan, menunjukkan adanya potensi besar penggunaan CNT dari biomassa sebagai alternatif *support* material untuk katalis pada PEMFC. Namun, ada beberapa hal yang perlu dioptimalkan untuk mencapai target tersebut:

1. Dispersi Pt yang lebih baik pada permukaan CNT masih perlu dimaksimalkan untuk dapat meningkatkan aktivitas kinetik yang lebih baik. Hal ini dapat dilakukan dengan mengoptimalkan parameter sintesis Pt seperti durasi waktu reduksi, temperatur yang digunakan dan *stirring*;
2. Penentuan *loading* Pt/CNT pada katoda dan Pt/C pada anoda harus sama besar agar dapat melihat perbandingan OCV dengan jelas;
3. Pengujian stabilitas katalis perlu dilakukan pada PEMFC untuk mengkonfirmasi ketahanan Pt/CNT.

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