

BAB V

KESIMPULAN

5.1. Kesimpulan

Kesimpulan yang dapat ditarik dari penelitian yang telah dilakukan adalah sebagai berikut:

1. Peningkatan berat molekul poli(vinil alkohol) (PVA) pada katalis akan meningkatkan kestabilan termal, kapasitas asam sampel, dan tidak mempengaruhi struktur katalis secara signifikan, dan menghasilkan *degree of crystallinity* yang bervariasi
2. Peningkatan rasio berat PVA akan mengakibatkan kapasitas asam sampel lebih rendah dan menyebabkan struktur sampel lebih kristalin atau *degree of crystallinity* yang lebih tinggi
3. Peningkatan rasio berat asam sulfosuksinat (SSA) akan meningkatkan kapasitas asam sampel, struktur sampel menjadi lebih amorf atau *degree of crystallinity* yang lebih rendah
4. Pengaruh peningkatan rasio berat PVA dan rasio berat SSA pada kestabilan termal katalis dan konversi *free fatty acid* (FFAs) bervariasi
5. Seluruh variasi sampel katalis PVA-SSA memiliki nilai kapasitas asam yang lebih tinggi dari katalis DPT-3
6. Konversi reaksi esterifikasi yang dihasilkan katalis PVA-SSA pada pengulangan pertama memberikan hasil yang lebih tinggi dari katalis DPT-3, dan bervariasi pada pengulangan kedua dan ketiga
7. Katalis yang dihasilkan belum memiliki ketahanan termal yang baik akibat degradasi pada temperatur-temperatur tertentu, terutama pada 120°C
8. Katalis yang dihasilkan belum memiliki kestabilan kimia yang baik karena terjadi penurunan nilai konversi reaksi pada reaksi berulang akibat proses *cross-linking* yang belum optimal

5.2. Saran

Saran yang dapat diberikan untuk peneliti-peneliti selanjutnya terkait topik ini adalah sebagai berikut:

1. Perlu dilakukan pencucian sampel katalis PVA-SSA setelah dilakukan proses *cross-linking* hingga SSA yang tidak teresterifikasi hilang
2. Perlu dilakukan studi lebih lanjut untuk memperoleh temperatur pengeringan dan *cross-linking* di dalam oven yang lebih baik
3. Perlu dilakukan analisis *degree of cross-linking* secara kuantitatif sebagai acuan pasti terikatnya gugus sulfonat pada polimer PVA menggunakan bantuan instrumen DSC (*Differential Scanning Calorimetry*) atau dengan metode kualitatif (membandingkan massa PVA-SSA yang tersisa setelah direndam di dalam air dengan massa awalnya)
4. Perlu dilakukan perhitungan jumlah gugus hidroksil pada sampel PVA secara akurat menggunakan metode seperti *hydroxyl value analysis* (titrasi antara KOH dan sampel yang direaksikan dengan asam)
5. Penggunaan SSA dalam katalis (rasio berat) tidak perlu dalam jumlah banyak karena terbukti tidak meningkatkan konversi secara signifikan

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