BAB 5

KESIMPULAN DAN SARAN

5.1. Kesimpulan

Setelah melakukan penelitian mengenai analisa fleksibilitas umpan tahap metanasi pada proses *power to gas* dengan model TREMP, maka kesimpulan yang didapatkan adalah sebagai berikut.

1. Model reaktor RGibbs mampu mensimulasikan reaksi metanasi yang diharapkan meskipun stoikiometri reaksi yang terbentuk tidak dispesifikasi dalam simulasi seperti model REquil.
2. *Recycle ratio* minimum yang diperlukan agar temperatur keluaran reaktor pertama tidak melebihi batas maksimum dari katalis nikel akibat perubahan *feed ratio* adalah 0,74.
3. Penurunan tekanan operasi relatif hanya sedikit berpengaruh terhadap performa reaktor namun akan meningkatkan kebutuhan volume setiap aliran dan unit proses.
4. Konfigurasi TREMP menggunakan tiga reaktor menghasilkan tingkat fleksibilitas umpan tertinggi pada kondisi umpan gas karbon dioksida berlebih dengan rentang *feed ratio* sebesar 0,25-0,5.
5. Pada kondisi umpan gas hidrogen berlebih, jumlah reaktor yang diperlukan hanya satu reaktor ketika *feed ratio* jauh dari rasio stoikiometri (F_{CO2}/F_{H2}=0.1-0.21) dan dua reaktor ketika *feed ratio* mendekati rasio stoikiometri (F_{CO2}/F_{H2}=0.22-0.25).
6. Semakin besar perbedaan *feed ratio* dengan rasio stoikiometri reaktan, beban pemisahan sisa reaktannya akan semakin besar.
7. Teknologi proses pemisahan sisa reaktan gas hidrogen cenderung lebih rumit dan mahal dibandingkan dengan pemisahan gas karbon dioksida.

5.2. Saran

Berdasarkan kesimpulan tersebut, maka saran yang dapat diberikan untuk penelitian selanjutnya adalah sebagai berikut.

1. Melakukan peninjauan ketika sistem dinamis dengan adanya kontrol sistem untuk mengetahui *range feed ratio* yang diperlukan serta jenis kontrol yang paling sesuai.

2. Melakukan peninjauan terhadap sumber umpan gas karbon lain seperti biomassa dan lain sebagainya.
3. Melakukan riset mengenai kinetika katalis yang sesuai untuk reaksi metanasi pada proses *power to gas.*

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