5.0 CONCLUSIONS AND FUTURE WORK

The addition of binder silica to precipitated 100Fe/5Cu/4.2K FT catalyst followed by spray drying increases the attrition resistance significantly. Within the range of the non-proprietary catalysts tested here, the optimum binder silica content is 10 to 12 wt %. The FT activity and selectivity of this catalyst are better than a Ruhrchemie catalyst at 250°C and 1.48 MPa. The addition of precipitated silica to catalyst containing 10 to 12 % binder silica decreases attrition resistance and increases methane selectivity. Based on the experience gained, a proprietary HPR-43 catalyst has been successfully spray dried in 500-g quantity. This catalyst showed 95 % CO conversion over 125 h of testing at 250°C, 1.48 MPa, and 2 NL/g.cat/h and had a less than 4 % methane selectivity. Its attrition resistance was one of the highest among the catalysts tested.

Future research needs to continue to focus on further increasing iron catalyst attrition resistance, activity, and selectivity for example by evaluating the effect of pretreatment, binder type, and promoter content. Hampton University, University of Pittsburgh, and Research Triangle Institute have reached an intelluctual property and commercialization agreement to further develop the iron catalyst. HPR-43 prepared and scaled up under this grant using a spray drier. Final catalyst activity and selectivity of HPR-43 is being evaluated in a slurry reactor at a host private company site. A patent application is being prepared for the iron catalyst. An agreement has been developed with the private company to evaluate the catalyst in a slurry reactor, both CSTR and SBCR. Initial test results reported by the private company have been promising. HPR-43 promises to be much more attrition resistant than the iron catalyst tested by DOE at the Laporte slurry reactor pilot plant. The private company also plans to carry out comparision testing of attrition, activity, and selectivity for HPR-43 and the iron catalyst tested at Laporte

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