

## **A FEW RECENT DEVELOPMENTS IN FLUIDIZED BED TECHNOLOGY APPLICATIONS FOR FUEL CONVERSION**

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In recent years, the process concepts based on two-stage and dual bed have been widely adopted in developing fuel conversion technologies including pyrolysis, combustion, gasification and catalytic cracking. These provide indeed advantages of, for example, easy operation and control, poly-generation of products, and high efficiency in elimination of undesirable product or pollutants. The so-called micro fluidized bed analyzer (MFBRA) has been newly developed to measure reaction rates at arbitrary temperatures, giving a great support to fundamental research and technology developments for fuel conversion. This report intends to summarize the involved new concepts, major fundamental understandings, pilot test and/or industrial demonstrations of a few newly developed fuel conversion technologies. Concretely, it will report fluidized bed two-stage gasification (FBTSG), dual fluidized bed pyrolysis combustion (DBPC), fluidized bed cracking gasification (FBCG) and MFBRA.

The FBTSG technology separates fuel pyrolysis in a FB pyrolyzer and char gasification in a transport bed gasifier. The latter enables high-temperature tar cracking under catalysis of char to enable remarkably low tar content in the produced gas [1]. For fuel with high contents of water and nitrogen, the DBPC technology first removes fuel water and most fuel volatile in a pyrolyzer. This, on the one hand, ensures stable combustion of the fuel, and on the other hand facilitates NO<sub>x</sub> reduction by char and pyrolysis gas [2]. The FBCG technology separates the catalytic cracking of heavy feedstock for liquid and the gasification of char, the cokes formed on the catalyst surface, to produce syngas and also to regenerate the catalyst. By using micro fluidized bed, the MFBRA is newly developed to enable the on-line pulse feeding and rapid heating of particle reactant. It effectively suppresses the interfacial diffusion limitation and minimizes the intra-particle diffusion [3]. Thus, MFBRA provides isothermal reaction analysis in comparison with that in TGA based on programmed heating.

### **REFERENCES**

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