Università degli Studi di Udine

Dottorato di Ricerca in Scienze dell'Ingegneria Energetica e Ambientale

Seminari del Corso di Dottorato

Small scale liquid fuel plant design through Fischer Tropsch synthesis

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Giovedi 20 Ottobre 2022, ore 11:00

Sala Riunioni Verde (SR 1, L1-0F-NF)

Abstract: Clean fuel and chemical production through Fisher Tropsch synthesis, from renewable carbon feedstock like biomass and carbon dioxide, are likely one important source of liquid fuel and chemicals in the post fossil fuel era. Although there have been some commercial Fischer Tropsch synthesis plants in operation worldwide, the feedstocks used are only limited to coal and natural gas. When using biomass or captured CO2 as feedstock, the scale of such plant would be limited, and the economics of such plant is in doubt as of the smaller scale if conventional design philosophy is applied. The Institute of Development for Energy for African Sustainability, a research institute at the University of South Africa, has relooked the liquid fuel production process from carbonaceous feedstock through Fischer Tropsch process and has developed a new process to be used in small scale Fischer Tropsch plant. The concept has been tried to utilize feed stocks from underground coal gasification (UCG) and biomass in the pilot scale and showed potential to be implemented commercially.

CV: Prof Xinying Liu is a full professor at the Institute for Development of Energy for African Sustainability (IDEAS), a research institute at the University of South Africa (UNISA). He is an expert in the field of catalytic and nano inorganic materials for energy application especially in Fischer Tropsch Synthesis (FTS), process synthesis, biomass to energy systems and alternative liquid fuel processes. He also has nearly 20 years of industrial and academic experiences in carbonaceous material indirect liquefaction process (XTL process), in pilot scale XTL facility design and operation, and small/medium scale XTL plant design. He has expanded his research into various other renewable energy solution suitable for off-grid and rural applications, and carbon dioxide utilization especially hydrogenation into clean fuel and chemicals. He has over 100 publications in peer reviewed journals and is serving as the committee member of the catalysis society of South Africa (CATSA). He was elected the member of Academy of Sciences of South Africa (ASSAf) in 2021.