Session of Focus Materialchemie – Wednesday, **10.04.2024** 16:00 – @ Seminarraum Lehar 01 (TU-Wien, Getreidemarkt 9, BC, OG. 01, room A46) – join us on ZOOM (ID: 983 0066 2349)

Fundamental studies of surface chemistry, structure, and catalytic activity of Fe-based spinel nanoparticles

M. Pittenauer[1], K. Föttinger[2]

michael.pittenauer@tuwien.ac.at

[1]Institute of Materials Chemistry, TU Wien, Austria

Spinel compounds (AB_2O_4) experience an increasing interest with catalysis being one of the most outstanding fields of application, where they are for instance used as nanomaterials in reactions such as high temperature water gas shift reaction (HT-WGS), various oxidation reactions and oxygen evolution reaction (OER). The catalyst currently in use for high temperature water gas shift reaction (HT-WGS) is chromium-iron oxide doped with copper. Although this system has been optimized for a long time, legislative initiatives require to find chromium-free catalysts for HT-WGS due to toxicity of Cr(VI). For this thesis, $CoFe_2O_4$ and $NiFe_2O_4$ have been chosen as initial candidates to conduct research upon. A comprehensive approach ranging from the synthesis of cobalt and nickel ferrite nanoparticles to their characterization by electron microscopy, spectroscopy, diffraction and physi-/chemisorption techniques as well as various in-situ and operando spectroscopy techniques is used to investigate the chemical state and coordination environment of A and B cations, the structure and surface composition of nanoparticles at reaction conditions in the gas phase and the reactivity and kinetics of and reaction mechanisms in HT-WGS and 2-propanol oxidation, which are relatively well understood as model reactions.