Physical Methods in Inorganic Chemistry

XAS/XPS – Dr. Rik V. Mom (UL)

X-ray spectroscopies offer the opportunity to investigate the chemistry of materials in an element by element manner. For example, in $CoNiFeO_x$ one can separately determine the oxidation state and bonding/coordination environment of the Co, Ni, Fe, and O atoms. In this way, X-ray spectroscopies are a powerful tool to understand the chemistry of complex materials or systems (e.g. the electrode-electrolyte interface). In the lecture, we will discuss two forms of X-ray spectroscopy in particular: X-ray photoelectron spectroscopy (XPS) and X-ray absorption spectroscopy (XAS). You will learn how these techniques can be used to study both the surface and the bulk of materials, including measurements during reactions (in situ/operando). I will illustrate this using examples from heterogenous catalysis, electrochemistry, and organometallic chemistry.