CATALYSIS BY INORGANIC MATERIALS: CONTROL AT THE SURFACE BY TAILORED INTERFACES AND ELECTRIC FIELDS

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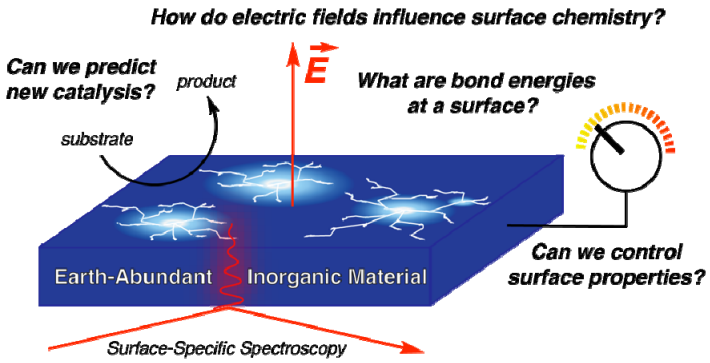
Heterogeneous catalysis is essential to most industrial chemical processes. However, these processes are often not efficient or selective enough, and typically use rare and expensive noble metals as catalysts. Improving the sustainability of current processes will rely on the development of new controls in catalysis and of abundant materials as catalysts. Earth-abundant transition metal phosphides and sulfides have recently emerged as promising materials in some catalytic applications, such as hydrotreating and water splitting.[1-4] This highlights the catalytic potential of transition metal phosphides and sulfides, but this potential has not been exploited much further yet. New discoveries are hampered by a limited understanding of the interfacial chemistry that determines the catalytic properties of these materials. This talk will discuss our current efforts in expanding the catalytic universe of the earth-abundant transition metal phosphides and sulfides, and in understanding the surface fundamentals that govern their behavior in catalysis. Furthermore, electric fields as a control element at the surface, and the influence of electric fields on surface properties and interfacial reactivity will be discussed.[5,6]



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