The mobile world depends on lithium (Li) -ion batteries batteries, which are the most prominent energy storage technology today. Especially for small-scale electronics, electrochemical energy storage using Li-ion batteries is the method of choice because of their ability to provide high energy and power densities. Electrochemical energy storage in Li-ion batteries is expected to be the key technology for electrically powered vehicles and is expected to contribute substantially to the balance of the supply and demand of renewable energies.

Especially silicon has attracted great attention as a promising anode material for Li-ion batteries due to its exceptional theoretical high specific capacity. Despite these preeminent properties, bulk silicon anodes face significant challenges due to the large volume changes upon lithiation, leading to mechanical fracturing of the active material and rapid capacity fading during electrochemical cycling.

In the cause of finding better anode materials for Li-ion batteries that are as equally promising as silicon, but not facing the same detrimental structural instability, silicon carbide (SiC) came into the picture. Some researchers expect SiC, a semiconductor known from high-power transistors, to make a high capacity and highly stable Li-ion battery anode. Despite these promising properties there is, so far, no generally valid theory and little understanding of the Li-ion storage in SiC.

So, in this project, we want to investigate the general Li-ion storage mechanism in SiC and obtain an understanding how a Li-ion electrochemically reacts with SiC. This will be achieved by identifying the affecting SiC material characteristics and by determining which reactions may hinder, enable or mask those Li-ion storage reactions.