

<b>Module:</b> Applied Electrochemistry: Batteries, Fuel Cells and other applications			
<b>University/department/institute:</b> Freie Universität Berlin/Department of Biology, Chemistry and Pharmacy/Institute of Chemistry and Biochemistry			
<b>Responsible for the module:</b> module lecturers			
<b>Admission requirements:</b> none			
<b>Qualification aims:</b> The students have deepened their knowledge and know the current applications of electrochemistry, including everyday applications. They have experience of the current state of fundamental research and understand the steps in the process chain leading to application. In the accompanying seminar, students research examples of current research, present them and discuss them critically in the group.			
<b>Content:</b> Principles (double layer models, Nernst equation, Butler-Volmer equation, Tafel equation, electrochemical cells), batteries for storing energy (structure using the example of a lithium ion battery, discussion of challenges and limitations of battery technology, use of modern materials and concepts such as Li-O and Li-S, redox-flow batteries); fuel cells for energy conversion (development of fuel cell technology, comparison of low temperature systems (polymer electrolyte membrane fuel cell – PEMFC, Direct methanol fuel cell – DMFC) and high temperature systems (solid oxide fuel cell – SOFC), design of new materials and production processes); materials and methods (carbon materials in fuel cells and batteries, carbon nanotubes, graphene, new electrolytes (solid and liquid)); methods for in-situ examination of batteries and fuel cells; current research topics in focus: water electrolysis, chloralkali electrolysis, concept of photoelectrochemical hydrogen generation; electrochemical sensors; electroluminescence; electrophoresis; corrosion protection			
<b>Teaching and learning units</b>	<b>Attendance</b> (Semester hours per week = SH)	<b>Forms of active participation</b>	<b>Study time</b> (hours)
Lecture	2	-	Attendance L 30 Preparation and follow-up L 30
Seminar	2	Contributions to discussion	Attendance S 30 Preparation and follow-up S 30 Examination preparation, examination 30
<b>Language of instruction</b>		German or English	
<b>Compulsory regular attendance</b>		Attendance recommended	
<b>Study time, total hours</b>		150 hours	5 CP
<b>Duration of module</b>		One semester	
<b>Module offered</b>		Not regularly	
<b>Application</b>		Master's program in Chemistry	