Abstract

The present thesis starts from the necessity to study and characterize the behavior of pH sensitive smart hydrogels. The microgravimetric principle of quartz micro balance for a precise investigation of the behavior of thin hydrogel films was used. For this, an automatic test bench, and a PVA/PAA coated quartzes frequency and damping measurement cell was designed and tested. Using a network analyzer and datalogger system, two data acquisition channels can be used for the recognition of the sensor behavior; it is possible to acquire frequency and bandwidth, and also relate them to the pH and temperature values inside the device.

As a result, it is possible to use hydrogel coated quartz crystals as liquid sensors to observe special state values of liquid media in real-time. PVA/PAA coated quartz crystals can be used for pH measurements in the range up to pH 3.5. In this region, measurements with a precision larger than pH 0.005 are realizable. QCMB techniques are a general suitable transduction principle for the use of hydrogels as sensor materials for the liquid sensorics.