

In-situ dielectric characterization of redox materials for plasma gas-conversion experiment

Motivation

In the framework of research focus “*Power-to-Molecules*” we are exploring promising technologies such as microwave sustained plasmas for the chemical reduction of carbon dioxide. To take an oxygen away from reaction products the special material is placed into plasma afterglow.

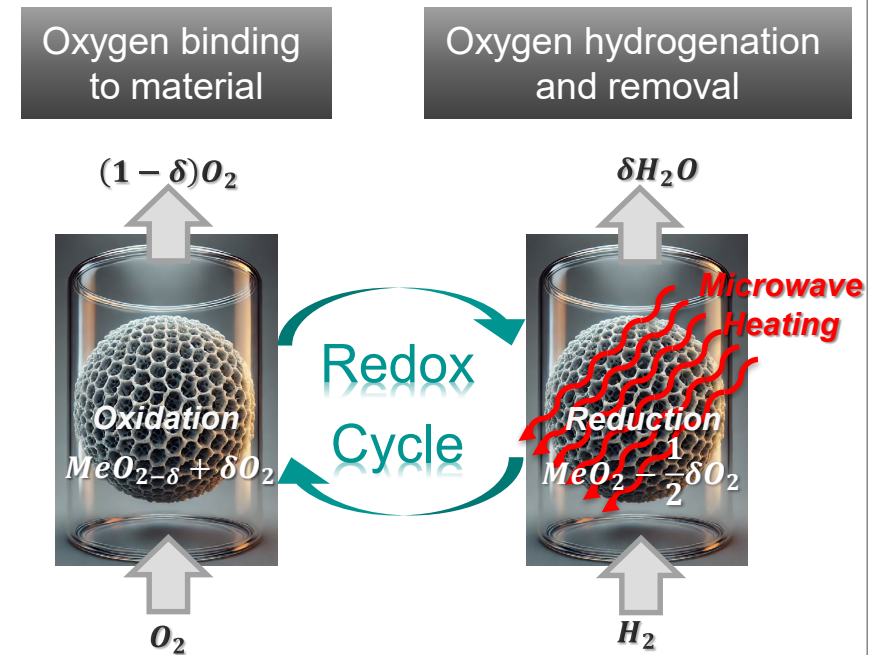
Task description

This work is focused on the design and development of a microwave system for the in-situ dielectric measurement based on the cavity perturbation method. It will be used for the dielectric characterization of redox reactions in inorganic materials (e.g. catalysts) as a function of temperature and chemical conversion, that are used in plasma gas conversion experiments. The tasks to be addressed are:

- Microwave resonator design & development (2.4-2.5 GHz band)
- Network analyzer, temperature sensors (e.g. IR pyrometer) and mass-flow controller(s) are to be integrated in the system
- GUI (Matlab/LabView) development for operation and control

Requirements

- Basic knowledge of high frequency technology
- Ideally experience with CST Microwave Studio



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