Contribution ID: **146** Type: **Poster (+) Presentation**

Electrical Impedance Spectroscopy: a tool to investigate interactions between complex fluids – porous materials

Wednesday, 2 June 2021 16:00 (1 hour)

An overview of the Electrical Impedance Spectroscopy (EIS) method targeting the physical processes specific to the water-based ink/substrate interaction is made in this work. After a brief introduction of the EIS technique , , two experimental setups will be presented as the main EIS measurement instruments: planar and respectively cylindrical electrodes. They have been employed to study material properties (e.g. dielectric constants) of complex materials as well as physical phenomena as water evaporation of aqueous mixtures, complex liquid transport into porous paper, latex film formation. Each experimental setup was dedicated to a specific process; regarding the dielectric constant measurements, this was possible to be made with both setups and a comparison of the outputs is made.

EIS was used for:
i) water evaporation from liquid mixtures;
ii) liquid penetration into porous paper considering the same liquid and different papers (e.g. thickness), as well the same paper and various liquids;
iii) latex film formation –revealing the structure of the solid formed film, have been tackled via the EIS method.

The dynamics of the physical processes (e.g. evaporation rate, liquid absorption rate, phases in latex film formation) have been studied having time as a parameter. Theoretical models and computational simulations were used to analyze the experimental data and to improve our understanding.
We consider the EIS as a valuable tool in these studies; however besides its advantages, we will discuss the limitations of the method, too.

Time Block Preference

Time Block A (09:00-12:00 CET)

References

E. Barsoukov, and J. R. Macdonald, Impedance Spectroscopy: Theory, Experiment, and Applications, 2nd Edn., John Wiley & Sons, 2005
M. Grossi and B. Riccò, J. Sens. Sens. Syst., 6, 303–325, 2017
N. Tomozeiu, Transport in Porous Media, Vol.115, No.3, 603-629, 2016

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