

PROGRAM BOOK

9th Brazilian-German Workshop on Applied Surface Science

SCHEDULE

MONDAY, 11-04

9:00	Carlos F. O. Graeff – <i>Opening</i>
Chairman - Hans-Peter Steinrück	
9:15	Hamilton Varela , IQSC-USP, São Carlos, SP, Brazil <i>“The effect of Temperature on the Oscillatory Electro-oxidation of Small Organic Molecules”</i>
10:00	Wolf-Dieter Schneider , Fritz-Haber-Institute of the Max-Planck-Society, Berlin, Germany <i>“Electron transport in thin oxide films: From phonon-polariton excitations to changes in the quantum structure of oxide-supported Gold nanoparticles”</i>
10:20	COFFEE
Chairman - Fernando Lazaro Freire Jr.	
10:40	Katharina Al Shamery , Physikalische Chemie, Universität Oldenburg, Oldenburg, Germany <i>“Chemistry at defects on titania”</i>
11:25	Carlos Cesar Bof Buffon , CNPEM, Campinas, SP, Brazil <i>“Hybrid Organic/Inorganic Molecular Heterojunctions Based on Strained Nanomembranes”</i>
12:10	LUNCH
Chairman – André Avelino Pasa	
14:00	Rui Nono Pereira , Walter Schottky Institut, TU München, Garching, Germany <i>“The role of surface defects in the charge transfer at wide gap semiconductor electrodes”</i>
14:45	Gilberto Medeiros Ribeiro , UFMG, Belo Horizonte, MG, Brazil <i>“State Dynamics and Modeling of Tantalum Oxide Memristors”</i>
15:30	<i>FAPESP and DFG</i>
16:30	COFFEE & POSTER SESSION
19:00	DINNER

Structuring of peroxotungstic acid with sodium dodecyl sulfate

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Surfactants play an important role in the synthesis of nanomaterial which, in presence of the precursor systems containing transition metals, permit the production of nanostructured oxides¹. Surfactants act as an aggregation inhibitor, controlling the nucleation, growth and porosity of the synthesized structures^{2,3}. We studied sodium dodecyl sulfate (SDS) as structuring agent of peroxotungstic acid (PTA) in ethanol/water (etOH/W) 1:4, v/v. The physical chemical behavior of the systems, containing 1-100 mmol.L⁻¹ SDS/10 mmol.L⁻¹ PTA/etOH/W (with and without 200 mmol.L⁻¹ NaCl), were characterized by conductivity, zeta potential and light scattering measurements. The micellar critical concentrations observed for aqueous systems (Fig. 1), with and without PTA, are similar and lower than the value reported for SDS/H₂O 10.8 mmol L⁻¹), which is affected by NaCl. The association PTA/SDS occurs by interaction of tungsten d orbitals with SDS sulfate groups. Aggregation thermodynamic parameters will be discussed. Films of the precursor systems were obtained by spin-coating on SiO₂/Si substrate and annealed at 500 °C. Electron scanning micrograph (Fig. 2) show WO₃ developed a flower-like micrometric morphology with is composed of nanospheres. These results are according to the nucleation model diffused limited cluster-cluster aggregation.

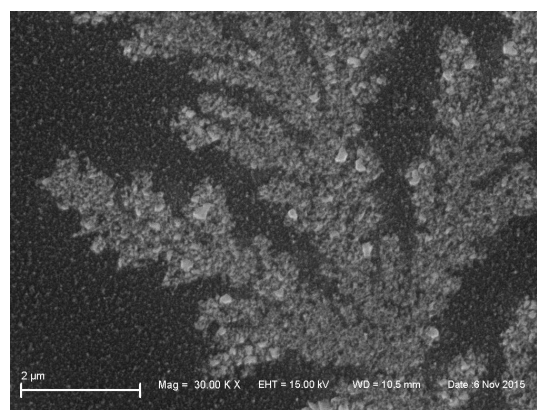
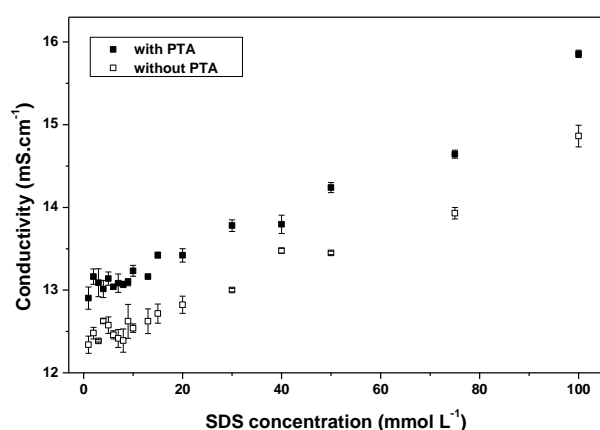


Fig.1: Conductivity versus concentration of the surfactant SDS/NaCl/ethanol/Water systems.

Fig.2: SEM micrograph of WO₃ film obtained from the precursor system composed of PTA/(50 mmol L⁻¹) / SDS / NaCl. 1000 X.

References

- [1] R. Darkins et al. *J. Amer. Chem. Soc.*, 29, (2013), 11609-11614.
- [2] C. L. Wu et al. *Surface & Coatings Technology*, 231 (2013), 403-407.
- [3] L. M. Bertus et al. *Mat. Chem. Phys.* 140, (2013), 49-59.