Electrochemical oxidation of slurries: a novel *chimie douce* synthetic method. Studies, characterization and examples.

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Soft chemistry, or *chimie douce*, has represented an alternative approach usually adopted in the synthesis of new compounds. That approach has two advantages. In the first place, the use of low temperatures and low pressures does not require the use of special, usually expensive, set-ups. This, along with the experimental conditions, reduces the cost of the synthesis. On the other hand, it allows the obtention of compounds or phases which can not be obtained by the regular solid-state methods, due to their instability at elevated temperatures and/or pressures.

Frequently used soft-chemistry methods are coprecipitation, in aqueous and non-aqueous media, ionic exchange in molten salts, and electrochemistry of solids. In this last method, the material of study is used in the form of a pressed and sintered pellet that acts as working electrode. Our work presents here an alternative to this set-up. Since not all materials can be sintered because of their decomposition during the process, the pellet is substituted by a platinum plate leaving the material in the solution as a suspension [1].

Slurries had been used in electrochemistry before, but in some cases the material suspended was acting just to catalyze [2,3] by dissolving slightly, and in other, Ag was electrochemically deposited from solid AgI [4]. In our case, the solid (sometimes solids) suspended gets oxidized, remaining as a solid. This is the case for $Ag_2Cu_2O_4$, which can be obtained from $Ag_2Cu_2O_3$, a mixture of Ag_2O and CuO or a mixture of Cu and Ag [5].

We have studied the effect of several parameters on the electrochemical response of a slurry, namely, scanning rate in a cyclic voltammetry on the intensity of the waves, nominal concentration of solid in suspension, stirring speed, etc.

It will also be remarked that the method has been useful for the treatment of a variety of phases. For example La_2CuO_4, previously oxidized in pellet form, can also be oxidized while on suspension yielding the known superconductor phase.

Acknowledgements :

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References:

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Figures:

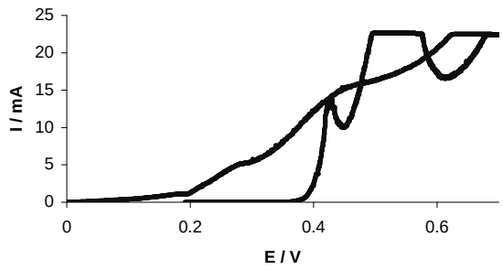

Figure 1.- CV of a $Ag_2Cu_2O_3$ slurry at 0.023 mV/s in a 1M NaOH aqueous solution.

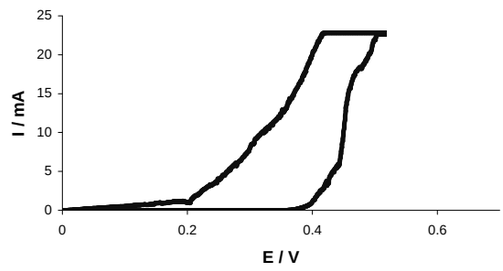

Figure 2.- CV of a $Ag_2Cu_2O_3$ slurry at 0.115 mV/s in a 1MNaOH aqueous solution.

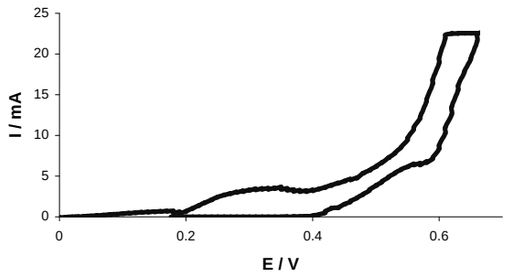

Figure 3.- CV of a $Ag_2Cu_2O_3$ slurry at 0.555 mV/s in a 1M NaOH aqueous solution.