Success Stories - Service Users

Reliable Copper Metallization for Current Collector in Energy Storage Application

Organisation Profile

GENESINK is a French SME created by Mrs Corinne Versini in 2010. We design nano inks with functionalities at their core from particles synthesis to the end printed product. Our challenge is to free up electronics to enable a new generation of consumer electronics products.

Rousset, France | www.genesink.com

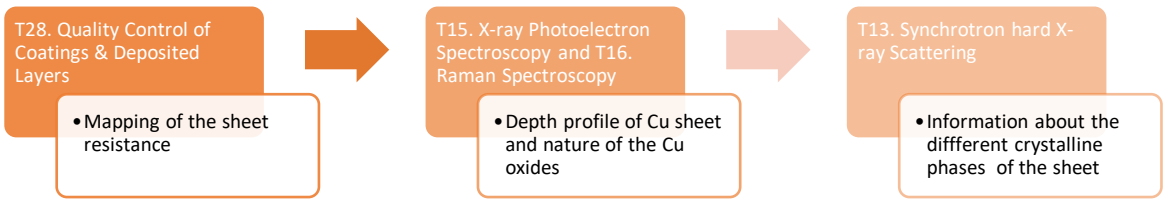
GENESINK
ENABLING DISRUPTIVE CONSUMER ELECTRONICS

Problem to be solved

GENESINK is developing two solutions for Copper metallization of polymer flexible substrates: (i) electroless metallization and (ii) deposition of Cu-based nanoinks. These Cu-metallized substrates will be integrated as current collector into printed flexible batteries. However, Cu is subject to oxidation during processing (manufacturing, deposition and curing). Besides, storage of Cu is a challenging task due to oxidation and/or aggregation of the nanoparticles (NPs). In the framework of the TEESMAT project, the study of the oxidation phenomena would help to improve the process towards reliable manufacturing of the current collectors for energy storage application.

Solution provided by TEESMAT

TEESMAT has provided accurate tools and techniques to assess the quality and the performance of the Cu-metallized substrates developed by GENESINK with the identification, mapping, and follow-up of the copper oxidation state. Different techniques allowed us (the SPs) to correlate the morphology and chemical composition with homogeneity and oxidation from macroscale to nanoscale. The Quality Control of coatings and deposited layers provided the mapping of sheet resistance, revealing the sheets' oxidised areas. With depth profile analysis, XPS identified Cu and Cu oxides distribution and concentration on the surface and across the bulk. Synchrotron hard X-ray Scattering distinguished between the different crystalline phases in the sample. RAMAN spectroscopy with single-point and mapping measurements revealed the Cu and Cu oxides concentration, distribution, structure and phase on the sample surface. Moreover, the TEESMAT platform offers a database with gathered results and samples tracking along with technical support provided by the SP.



Impact

The main impact is that TEESMAT helped us understand the oxidation phenomena that we were facing and then improve our manufacturing process of Cu-metallized substrates towards more reliable products with lower environmental impact than conventional subtractive methods. This story will be published in a scientific journal. Thanks to TEESMAT, we have a way to communicate our products' performance for the Energy Storage Application.

TEESMAT is an EU project that has received funding from the H2020, under Grant Agreement n 814106 (H2020-NMBP-TO-IND-2018)