

Vibrational Spectroscopies for Characterization of Materials for Electrochemical Storage Devices

Mauro FALCONIERI - *ENEA*

In the frame of the "Technologies and materials for electrochemical and thermal storage" work package of the National Project "Ricerca di Sistema Elettrico", two lines of activity were dedicated at ENEA to the selection of relevant characterization techniques, to the establishment of suitable measurements protocols and to the characterization of commercial and specialty materials and components for electrochemical storage devices [1]. After having introduced the activities performed along this program, in this talk we focus on the capabilities and use of vibrational spectroscopies, such as infrared absorption and Raman spectroscopy, for the characterization of anode[2], cathode and separator materials, and we discuss experimental results obtained in practical cases. Given their chemical and structural diagnostic capabilities, to the scarce, if any, necessity of sample preparation and to their spatial resolution, these techniques actually represent an important counterpart to the electrochemical characterization.

References

[1] "Development of reporting methodologies", Batteries Europe European Technology and Innovation Platform, in https://energy.ec.europa.eu/reporting-methodologies_en

[2] Pozio, A.; Di Carli, M.; Aurora, A.; Falconieri, M.; Della Seta, L.; Prosini, P.P. Hard Carbons for Use as Electrodes in Li-S and Li-ion Batteries. *Nanomaterials* 2022, 12, 1349. <https://doi.org/10.3390/nano12081349>

Acknowledgments: This work has been financed by the Research Fund for the Italian Electrical System under the Three Year Research Plan 2022-2024 (DM MITE n. 337, 15.09.2022), in compliance with the Decree of April 16th, 2018".