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**Program
and
Book of Abstracts**

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O.S.9.

Ion-beam irradiated graphene oxide, 12-tungstophosphoric acid and their nanocomposites for electrochemical supercapacitors

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Ion beam modification of materials is notable method for achieving their unique structural, electronic, and other physicochemical properties. In the case of graphene oxide (GO) such modification of structure and surface chemistry is known to yield properties interesting for electrochemical supercapacitors. The performance of GO supercapacitors can be additionally improved by incorporating components with attractive redox properties. In this work, the influence of ion beam irradiation on synergy of GO and 12-tungstophosphoric acid (WPA) in their nanocomposite was investigated. For that, both components and their composites with different mass ratios were irradiated using different ion species, fluences and energies (from 10 keV C to 710 MeV Bi). For the irradiated WPA, results showed clear correlation between ion beam parameters, degree of structural modification and electrochemical properties. With increasing structural modification, bond breaking is first induced giving higher catalytic activity toward HER. Further irradiation resulted in an increased interconnection of polytungstate species producing lower catalytic activity and lower lithiation capacity. Irradiated GO showed modified surface chemistry, with preferable reduction of alkoxy and epoxy groups, changes in morphology and electric properties due to increased number of defects with increasing fluence, synergic effect of ion beam irradiated GO and WPA resulted in higher capacitance of irradiated composites compared to GO presumably because of interaction of structurally modified WPA with defect sites on GO thus reducing electrolyte flow along ion tracks.