Thierry BROUSSE

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Thierry Brousse is Full professor of Materials Chemistry at Polytech Nantes, the Faculty of engineering of Nantes Université, France, and a senior researcher at Institut des Matériaux de Nantes Jean Rouxel (www.cnrs-imn.fr), where he leads a group of *ca.* 10 Assistant Professors, Engineers, PhD students and postdocs. He received his PhD in 1991 from University of Caen. During his sabbatical in 2001-2002 at Prof. Bélanger's lab at UQAM in Canada, he started working on oxide-based electrodes for electrochemical capacitors, and he initiated this research activity in his lab back in France. With his team as well as international collaborators, he co-authored 8 books' Chapters and 199 peer-reviewed journal publications. He was awarded 8 patents dedicated to advanced materials and components for electrochemical devices. He was vice-dean of the University of Nantes from 2013 to 2020 in charge of innovation and technology transfer. He organized the first ISEECap meeting in 2009 in Nantes (International Symposium on Enhanced Electrochemical Capacitors, ISE sponsored meeting) which gathered more than 100 scientists from the ECs international community for the first event. This International Symposium is now taking place every two years in Europe. He serves as an associate editor of the ECS Journal of Electrochemical Society since 2012 for the Batteries and Energy Storage topic of interest. He is currently serving as Chair of Division 3 for the International Society of Electrochemistry.

Title: From supercapacitors to high power batteries: where is the crossing?

Abstract:

Transition metal oxides have been the topic of many research studies as electrodes for supercapacitors or high power batteries. Multivalent cations such as V, Mn, Fe, Nb, W have shown their usefulness in multicationic oxide structures. $FeWO_4$ demonstrated a pseudocapacitive behavior related to Fe^{3+}/Fe^{2+} redox couple with W^{6+} acting as spectator cation. Hexagonal tungsten bronze such as Li_xWO_3 depicted an intermediate behavior between pseudocapacitive charge storage and Li^+ intercalation when operated in aqueous electrolyte. At the other side of the spectrum, $H_{0.25}Cs_{0.25}Nb_{2.5}W_{2.5}O_{14}$ has been investigated as possible negative electrodes tailored for high power batteries and hybrid devices, in organic based electrolyte. All these examples point out the existence of a continuum between the different devices. Investigating charge storage mechanism is the key to understand the role of cations in oxides and subsequently to design high rate electrodes that can be used in various devices.