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Organic biomaterials for electrochemical energy conversion and storage

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Keynote: The presentation gives an overview of the potential utilization of organic biomaterials as performance components of electrochemical devices for energy storage and conversion. One analysis of the growing interest in the application of e.g. cellulose, carrageenan, silk fibroin, polylactic acid, (poli)peptides, their blends and composites in fuel cells and batteries. A summary of the general properties such as structure and composition, chemical and thermal stability, and of functional properties such as electrical (electronic and ionic) conductivity, transport numbers and mechanical resistance is presented in the context of the application requisites. Their natural abundance, properties variability associated to a natural origin and cost are also presented. The information is used to provide a global perspective on the advantages and disadvantages of such natural materials in the envisaged performance-critical applications.