

# NaCl-glycerol deep eutectic electrolyte: a green alternative for high-voltage supercapacitor

Daniele Motta<sup>a</sup>, Alessandro Damin<sup>a</sup>, Hamideh Darjazi<sup>b,c</sup>, Stefano Nejrotti<sup>a,d</sup>, Federica Piccirilli<sup>e,f</sup>, Giovanni Birarda<sup>e</sup>, Claudia Barolo<sup>a,c,d</sup>, Claudio Gerbaldi<sup>b,c</sup>, Giuseppe Antonio Elia<sup>b,c</sup>, Matteo Bonomo<sup>a,c,g,\*</sup>

<sup>a</sup>Department of Chemistry, NIS Interdepartmental Centre and INSTM Reference Centre, Università di Torino, Torino 10135, Italy

<sup>b</sup>GAME Lab, Department of Applied Science and Technology – DISAT, Politecnico di Torino, Torino 10129, Italy

<sup>c</sup>National Reference Center for Electrochemical Energy Storage (GISEL) – INSTM, Firenze 50121, Italy

<sup>d</sup>Institute of Science, Technology and Sustainability for Ceramics (ISSMC-CNR), Via Granarolo 64, 48018 Faenza, Italy

<sup>e</sup>Elettra Synchrotron Light Source, Basovizza 34149, Trieste, Italy

<sup>f</sup>Area Science Park, Padriciano 34149, Trieste, Italy

<sup>g</sup>Department of Basic and Applied Sciences for Engineering (SBAI), Sapienza Università di Roma, Roma 00161, Italy

\*matteo.bonomo@unito.it



Photovoltaic and wind energy systems are widely recognized as effective alternatives to fossil fuels in electricity generation. However, due to their intermittent and unpredictable nature, efficient electrochemical energy storage systems must be integrated to ensure a continuous and reliable energy supply [1]. For energy storage to truly support a sustainable future, it is essential to avoid the use of toxic or hazardous substances, such as those commonly found in commercial organic electrolytes [2]. Over the past two decades, deep eutectic solvents (DESs) [3] have emerged alongside ionic liquids (ILs) as promising alternative electrolytes for electrochemical applications, as a result of their low volatility, low flammability, and favorable electrochemical stability [4]. Herein, we present a sustainable electrolyte based on sodium chloride as hydrogen bond acceptor and glycerol as hydrogen bond donor. Through a comprehensive multi-technique study, employing Raman and FTIR spectroscopies, we point out the effect of the structuring of the system, such as the conformational changes of the polyol and the alteration of the hydrogen bond network, on the transport and electrochemical properties. The 1:10 molar ratio DES shows good performance when implemented in an electrochemical double layer capacitor, with a high operating voltage of 2.6 V and a capacitance retention of 96% after 1000 cycles [5]. These results underscore the potential of glycerol-based DESs as green, viable electrolytes for next-generation sustainable energy storage systems.

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## References

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