

Ionic liquids electrolytes: industrial challenges from lab to market

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To optimize the electrolyte is one of the most important directions to take in order to improve the new generation batteries in terms of performance, including cell cyclability, rate capability, safety, and lifespan. In this presentation we will present the strategic key points of ionic liquids production to achieve commercialization goals and meet the expectation of battery manufacturers: ionic liquids purity, process and scale-up, low-cost production. Meanwhile, our R&D objective is to study ionic liquids-based electrolytes on various anode/cathode systems to provide a thorough basis for rational selection of future optimal electrolytes [2], [3], [4].

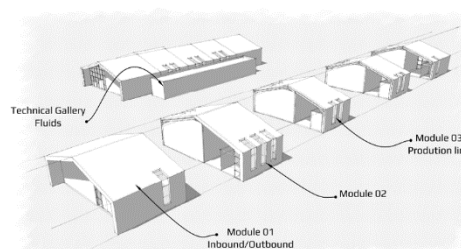


Figure 1. Ionic liquids production line modular strategy.

Ionic liquids (ILs) adoption may indeed enhance the safety and reliability of batteries without compromising their performance. Imidazolium, tetraalkylammonium and saturated cyclic aliphatic quaternary ammonium such as pyrrolidinium were found to be the most viable cations for Li-ion batteries ionic liquids for instance. Among them, ions displaying small steric hindrance and asymmetric structure are particularly appealing as they combine low viscous drag (fast ion transport properties) with ion crystal packing hindering (low melting temperature), together with wide electrochemical stability [2]. Those properties will be discussed in more details.

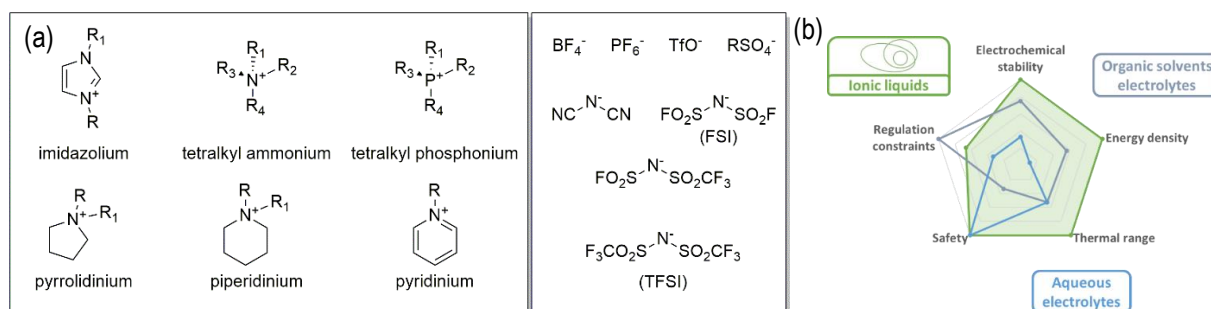


Figure 2. (a) Cations and anions commonly used for the formulation of ionic-liquid electrolytes. (b) Advantages of using ionic liquids as electrolytes in electrical energy storage devices. [2]

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