

# Chemistries of Lithium-ion Batteries : A state of the art

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## Abstract

Tremendous efforts have been devoted to replace typical fossil energy sources causing environmental deterioration and global warming by efficient alternatives such as renewable clean energy power sources ensuring the growth in demand for energy. Such efforts have led to the development of competitive energy storage systems. Particularly, lithium-ion batteries (LIBs) have attracted extensive interest thanks to their high energy density, long cycle life, high efficiency, and distinguished cycle performance, and stand as the best candidate used for a wide variety of applications from portable electronics to electric vehicle and large-scale energy systems.

Even though there has been a very remarkable progress steps toward the improvement of LIBs since their first commercialization in 1990, more sustainable developments enhancements of the battery properties in term of safety, performance (energy density, lifetime, rate capability) and production costs are still needed in order to satisfy the industrial and social demands. These properties of the battery are related directly to the properties of its components: , namely the anode, the cathode, and the electrolyte. This presentation will give an overview of the commercialized chemistries used in the cathode, the anode and the electrolyte.

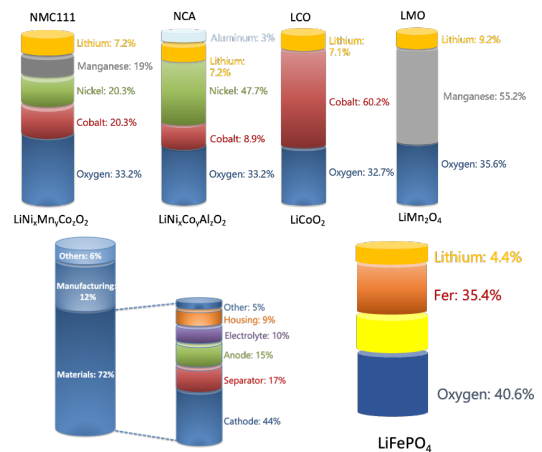


Fig. 1: Cathode materials chemistries

## Recent Publications (maximum 5)

1. H. Aziam, ... I. Saadoun, J. Energy Storage, 62 (2023) 106838
2. El Kacemi, .. I. Saadoun, Solid State Ionics, 392, (2023) 116167
3. C Hakim, ..., I Saadoun, Electrochim. Acta 438, (2023) 141540
4. H Aziam, ...,I Saadoun, Renew. Sustainable Energy Rev. 167, (2022) 112694
5. M. Amou,.. I. Saadoun, J. Power Sources, 532 (2022) 231310

## Biography



Prof. Ismael SAADOUNE was graduated from the University of Bordeaux, France (French PhD, 1992) and the University Cadi Ayyad UCA-Marrakech, Morocco (Moroccan PhD, 1996). 30 PhD Students have been under his supervision, all of them have successfully pursued jobs in industry or in research laboratories. He is the Principal Investigator of 19 national and 20 international research funded projects on energy storage. He was involved in two European Masters ERASMUS MUNDUS. In 2020, he was nominated as the Director of IMED-Lab. where 28 professors and 53 PhD students conduct their R&D on sustainable materials and Energy. Prof SAADOUNE was invited in many prestigious universities/research centers (Uppsala University Sweden; KIT, Germany, Jilin University, China). He is currently a member of editorial boards for three journals and reviewer of more than 200 research papers. His publications have received more than 4700 citations and his current Hirsch Index is  $h = 29$  (Scopus).

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