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The Critical Role of Carbon in the Chemical Delithiation Kinetics of $LiFePO_4$

Montserrat Galceran,[1,z] Abdelbast Guerfi,[2] Michel Armand,[1] Karim Zaghib,[2,*] and Montse Casas-Cabanas[1,z]

[1]*Centro de Investigación Cooperativa de Energías Alternativas (CIC energiGUNE), Basque Research and Technology Alliance (BRTA), Parque Tecnológico de Alava, 01510 Vitoria-Gasteiz, Spain*
[2]*Centre of Excellence in Transportation Electrification and Energy Storage (CETEES), Hydro-Québec, Varennes, QC J3X1S1, Canada*

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Abstract

The chemical delithiation of $LiFePO_4$ has been carefully studied using two different types of $LiFePO_4$: (1) carbon coated $LiFePO_4$ and (2) non-carbon coated $LiFePO_4$. We have observed that only carbon coated $LiFePO_4$ can be successfully delithiated at room temperature using $Na_2S_2O_8$ as oxidizing agent. In order to unravel the role of carbon in the chemical delithiation process of non-carbon coated $LiFePO_4$ we have performed a systematic study using different carbon sources as well as different amount of extraneous carbon in the solution. The results obtained demonstrate that the addition of carbon is fundamental for the effective removal of lithium at room temperature, and only a very small amount of carbon of any nature is enough to achieve the successful chemical delithiation of non-carbon coated $LiFePO_4$.

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