

The Importance of Structure in the Design of Lithium Battery Materials

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Since 1990, rechargeable lithium batteries have made a huge impact in powering consumer electronic devices such as cell phones and laptop computers [1]. The need for new insertion electrode structures that will provide additional energy, power and a superior cycle life to satisfy the increasing demands for reliable and safe high-energy/high power batteries by the transportation, medical, space, and defense sectors will ensure that lithium battery research will continue for many more years to come. This presentation will review the progress that has been made over the past 15 years and it will highlight the critical role that structure plays in the design and operation of lithium battery electrodes. Recent advances that have been made in designing two-component, structurally-integrated materials to achieve performance objectives will be discussed [2, 3]. The presentation will be made in the context of the advantages and limitations of other battery systems.

[1] Tarascon J.M., Armand M., *Nature*, 2001, **414**, 359. [2] Kim J-S., Johnson C. S., Vaughey J. T., Thackeray M. M., Hackney S. A., Yoon W., Grey C. P., *Chem Mater.*, 2004, **16**, 1996. [3] Thackeray M. M., Johnson C. S., Vaughey J. T., Li N., Hackney S. A., *J. Mater. Chem.*, 2005, *in press*.

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