

Accepted Manuscript

The effect of lithium-intercalation on the mechanical properties of carbon fibres

Eric Jacques, Maria H. Kjell, Dan Zenkert, Göran Lindbergh

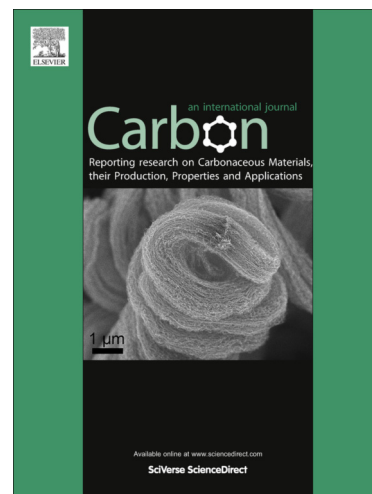
PII: S0008-6223(13)01121-4

DOI: <http://dx.doi.org/10.1016/j.carbon.2013.11.056>

Reference: CARBON 8567

To appear in: *Carbon*

Received Date: 29 June 2013



Please cite this article as: Jacques, E., Kjell, M.H., Zenkert, D., Lindbergh, G., The effect of lithium-intercalation on the mechanical properties of carbon fibres, *Carbon* (2013), doi: <http://dx.doi.org/10.1016/j.carbon.2013.11.056>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

The effect of lithium-intercalation on the mechanical properties of carbon fibres

Eric Jacques^{a,*}, Maria H. Kjell^b, Dan Zenkert^a, Göran Lindbergh^b

^a Department of Aeronautical and Vehicle Engineering, Lightweight Structures, KTH
Royal Institute of Technology, SE-10044, Stockholm, Sweden

^b Department of Chemical Engineering and Technology, Applied Electrochemistry,
KTH Royal Institute of Technology, SE-10044, Stockholm, Sweden

Abstract

Carbon fibres (CFs) can be used as lightweight structural electrodes since they have high specific tensile stiffness and ultimate tensile strength (UTS), and high lithium (Li)-intercalation capability. This paper investigates the relationship between the amount of intercalated Li and the changes induced in the tensile stiffness and UTS of polyacrylonitrile-based CF tows. After a few electrochemical cycles the stiffness was not degraded and independent of the measured capacity. A drop in the UTS of lithiated CFs was only partly recovered during delithiation and clearly larger at the highest measured capacities, but remained less than 40 % at full charge. The reversibility of this drop with the C-rate and measured capacity supports that the fibres are not damaged, that some Li is irreversibly trapped in the delithiated CFs and that reversible strains develop in the fibre. However, the drop in the strength does not vary linearly with the measured capacity and the drop in the ultimate tensile strain remains lower than the CF

* Corresponding author. Tel: +46 73 034-4940. E-mail address: ejacques@kth.se (E.

Jacques)

Download English Version:

<https://daneshyari.com/en/article/7854779>

Download Persian Version:

<https://daneshyari.com/article/7854779>

[Daneshyari.com](https://daneshyari.com)