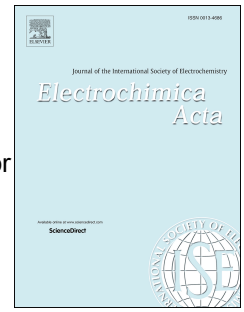
# Accepted Manuscript




Morphology-dependent electrochemical properties of sol-gel synthesized $LiCoPO_4$ for aqueous hybrid capacitors

Natarajan Priyadharsini, Sathyanarayanan Shanmugapriya, Palanisamy Rupa Kasturi, Subramani Surendran, Ramakrishnan Kalai Selvan

PII: S0013-4686(18)31853-X

DOI: 10.1016/j.electacta.2018.08.086

Reference: EA 32572

To appear in: *Electrochimica Acta*

Received Date: 27 March 2018

Revised Date: 7 July 2018

Accepted Date: 15 August 2018

Please cite this article as: N. Priyadharsini, S. Shanmugapriya, P.R. Kasturi, S. Surendran, R.K. Selvan, Morphology-dependent electrochemical properties of sol-gel synthesized $LiCoPO_4$ for aqueous hybrid capacitors, *Electrochimica Acta* (2018), doi: 10.1016/j.electacta.2018.08.086.

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.

ACCEPTED MANUSCRIPT

# Morphology-dependent electrochemical properties of sol-gel synthesized $LiCoPO_4$ for aqueous hybrid capacitors

Natarajan Priyadharsini[a,b§], Sathyanarayanan Shanmugapriya[a§], Palanisamy Rupa Kasturi[a], Subramani Surendran[a], Ramakrishnan Kalai Selvan[a*]

[a] *Energy Storage and Conversion Devices Laboratory, Department of Physics, Bharathiar University, Coimbatore - 641 046, Tamil Nadu, India.*

[b] *Department of Physics, PSGR Krishnammal College for Women, Coimbatore- 641 004, Tamil Nadu, India.*

**Abstract:**

Featured with superior structural stability and highest redox potential, the olivine $LiCoPO_4$ parades itself as a conceit battery-type material. To deploy its foot in the field of hybrid supercapacitors a series of $LiCoPO_4$ with three contrasting morphologies were achieved. The evolution of morphology from clustered microspheres to elongated rods and multifaceted submicronic particles has an appreciative effect on the particle size and electrochemical properties. Endowed with distinct qualities such as high crystallinity, and multifaceted morphology of $LiCoPO_4$ prepared at alkaline pH provides a superior specific capacitance of 381 C $g^{-1}$ (1060 F $g^{-1}$) at 1 mV $s^{-1}$ and a maximum discharge specific capacitance of 253 C $g^{-1}$ (631 F $g^{-1}$) at 0.6 mA $cm^{-2}$. The fabricated hybrid supercapacitor using prepared $LiCoPO_4$ at the pH-12 condition as a battery type positive electrode and $Fe_2O_3$ as the negative electrode provides a grander energy density of 18 Wh $kg^{-1}$ at an enhanced power density of 443 W $kg^{-1}$ with a sustained cyclic performance for about 5000 cycles.

**Keywords:** Olivine; Lithium cobalt phosphate; sol-gel synthesis; Morphological effect; Hybrid capacitor

*Corresponding author: selvankram@buc.edu.in (R.K.Selvan)

Download English Version:

https://daneshyari.com/en/article/11028267

Download Persian Version:

https://daneshyari.com/article/11028267

Daneshyari.com