

Cheap and abundant organic perylene diimide based pigment as electrode material for rechargeable batteries

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Since their discovery, the energy storage properties of organic electronic conductors have been widely studied [1]. Their versatility could provide an attractive alternative to inorganic active materials, since no expensive and polluting metals are used in their preparation. Among all organic molecules and structures, pigments are a valuable choice mainly because the low cost due to the widely use in painting and coating applications. Pigments, by definition, are insoluble in the dispersed medium and so they do not dilute in the electrolyte solution. Moreover, they often share a planar structure and consequently pigments are normally find in a graphite-like macro structure, suitable for reversible reaction with either alkaline ions and anions. Aim of this paper is to present the morphological, structural and electrochemical features of the perylene diimide (PDI) pigment. When processed as electrode materials (75% of active material in the formulation), the PDI shows a reversible capacity of 90 and 60 mAh/g after 100 and 1000 cycles, respectively, at 1.2 C rate (see Figure 1).

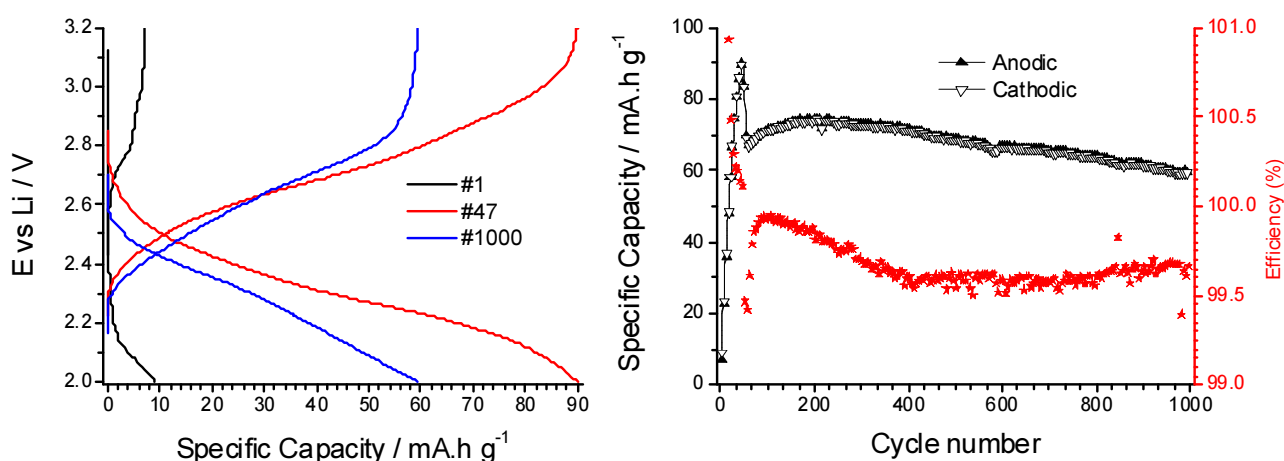


Figure 1. Charge discharge profile and long cycling results of PDI based electrodes.

[1] P. Novák, K. Müller, K. S. V. Santhanam and O. Haas, Chem. Rev. 97 (1997) 207–282.

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