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Nanomanufacturing — Key control characteristics

Part 4-1 Cathode nanomaterials for lithium ion batteries — Electrochemical characterisation, 2-electrode cell method

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

NANOMANUFACTURING – KEY CONTROL CHARACTERISTICS –

Part 4-1 Cathode nanomaterials for lithium ion batteries – Electrochemical characterisation, 2-electrode cell method

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Technical specifications are subject to review within three years of publication to decide whether they can be transformed into International Standards.

IEC 62607-4-1, which is a technical specification, has been prepared by IEC technical committee 113: Nanotechnology standardization for electrical and electronic products and systems.

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The text of this technical specification is based on the following documents:

Enquiry draft	Report on voting
113/173/DTS	113/192/RVC

Full information on the voting for the approval of this technical specification can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts of the IEC 62607 series, published under the general title *Nanomanufacturing – Key control characteristics* , can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- transformed into an International Standard,
- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

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INTRODUCTION

The future utilisation of renewable energy technologies depends significantly on the development of efficient systems for energy storage. Conventional approaches exist for the storage of electrical energy from stationary power plants, currently fuelled by many new ideas in conjunction with the emerging "smart grid". For future e-mobility for individual transportation there is only one attractive solution: a battery that can store enough energy to allow all-electric driving with a range of several hundred kilometres. The current solutions already on the market can only be regarded as temporary solutions. From today's perspective, lithium-ion batteries and their derivative innovative concepts must be regarded as the most promising candidates. Electrodes made from nanoscale composites will play a key role in the future. Innovative materials will be developed and systematically optimized, which implies testing of a large number of different materials.

Characterization of the electrochemical properties of cathode nanomaterials used in lithium ion batteries is important for their customized development. This IEC technical specification provides a standard methodology which can be used to characterize the electrochemical properties of new cathode nanomaterials that will be employed in lithium ion batteries. Following this method will allow comparison of different types of cathode nanomaterial and comparison of the results of different research groups.

A revised edition 2.0 is already under preparation to introduce changes proposed by IEC SC 21A. The future edition may e.g. include the following changes:

- The title will be amended: the term “lithium ion batteries" will be replaced by “nano-enabled electrical energy storage”.
- The scope will be revised to change the phrase "lithium ion battery" to e.g., "lithium ion batteries utilizing lithium iron phosphate".
- The definition of "electrode nanomaterials" will be revised to be more specific, reading e.g. "electrode containing a nanomaterial portion of more than xx% by weight".

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