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(54) UNIFORMLY MODIFIED CATHODE MATERIAL FOR SILICON-BASED LITHIUM ION BATTERY, PREPARATION METHOD THEREFOR AND APPLICATION THEREOF

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(57)ABSTRACT

The structure of cathode material for a silicon-based lithium ion battery is that carbon atoms are uniformly dispersed and distributed in a silicon (II) oxide matrix on an atomic scale. The average particle diameter D50 of the particles in the cathode material for the silicon-based lithium ion battery is 1 nm to 100 μ m, and the specific surface area is 0.5 m²/g to $40 \text{ m}^2/\text{g}$; and the mass of the carbon atoms accounts for 0.1%to 40% of the mass of the silicon (II) oxide matrix. In the disclosure, a carbon-containing gas source is introduced during the preparation process of silicon (II) oxide, and the distribution of carbon atoms in the silicon (II) oxide is bulk phase distribution, the cathode material has carbon bulk phase doping, which improves the electrical conductivity of the material and the cycling stability of lithium ion batteries.

Under a protective atmosphere, subject a carbon-containing gas source and a preheated mixed vapor of silicon and silicon dioxide to a gas phase mixing reaction for 1-24 hours to obtain a material in which carbon atoms are uniformly dispersed in a silicon (II) oxide matrix at an atomic level.

Cool the material to room temperature and discharge, pulverize and screen same to obtain particles in which the carbon atoms are uniformly dispersed in the silicon (II) oxide matrix at an atomic level, i.e., a negative electrode material for a silicon-based lithium ion battery.

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