CLAIMS:

1. A method for preparing lithium-containing particles suitable for use in an electrode of a battery, comprising:
   a) forming a mixture comprising titanium dioxide precursor nanoparticles and an aqueous solution of a lithium compound, wherein the titanium dioxide precursor particles consist of greater than 95% anatase phase;
   b) heating the mixture at a temperature of at least 80 °C for at least 3 hours in a sealed pressure vessel at autogenous pressure in order to form lithium-inserted titanium dioxide nanoparticles, wherein at least one particle size characteristic selected from the group consisting of average primary particle size, average intra-particle pore size, average inter-particle pore size, of the titanium dioxide nanoparticles is within 10 percent of the same size characteristic of the titanium dioxide precursor nanoparticles; and
   c) calcining the lithium-inserted titanium dioxide nanoparticles to form lithium titanate spinel nanoparticles.

2. The method of claim 1, wherein both the titanium dioxide precursor particles and the lithium-inserted titanium dioxide particles are characterized by one or more of the following:
   a. an average intra-particle pore size in the mesopore range; and
   b. a monodisperse intra-particle pore size distribution.

3. The method of any one of claims 1 to 2, wherein the lithium compound is selected from the group consisting of lithium hydroxide, lithium oxide, lithium chloride, lithium carbonate, lithium acetate, lithium nitrate, and combinations thereof.

4. The method of any one of claims 1 to 2, wherein the pH of the mixture is greater than about 9, or wherein the amount of lithium compound in the mixture is between 2 and 20 weight percent based on the weight of the titanium dioxide particles.

5. The method of claim 1, wherein the calcining step comprises heating the lithium-inserted titanium dioxide particles at a temperature of no more than about 650°C.

6. Lithium-containing particles suitable for use in an electrode of a lithium-ion battery, comprising a plurality of lithium titanate spinel nanoparticles, wherein the lithium titanate spinel particles have an average primary particle size of no more than 80 nm and a monodispersity of particle size such that all particles have a primary particle size within 10 percent of the average primary particle size, optionally wherein said particles are characterized by one or more of the following:
   i. an average intra-particle pore size in the mesopore range;and
   ii. a monodisperse intra-particle pore size distribution.

7. A battery comprising a first electrode, a second electrode, and a separator comprising an electrolyte between the first and second electrodes, wherein one of the first and second electrodes comprises the particles of claim 6.