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Coating Active Materials for Applications in Electrochemical Devices (IN-09-043)

Unique carbon-coated cathodes that improve electrical conductivity.

The Invention

A process that includes suspending/dissolving an electro-active material and a carbon precursor in a solvent; and then depositing the carbon precursor on the electro-active material to form a carbon-coated electro-active material.

The method avoids the high temperature, pressure and manufacturing extremes of conventional chemical vapor deposition and other pyrolysis methods of preparation. When carbon-coated metal oxides (for electro-active materials) are prepared, the metal oxide often reduces to the metal species. Argonne's method can produce carbon-coated metal oxides without the problems associated with reductions. The carbon precursor can be graphene, graphene oxide, carbon nanotubes, their derivatives or a combination of any two or more such carbon precursors.

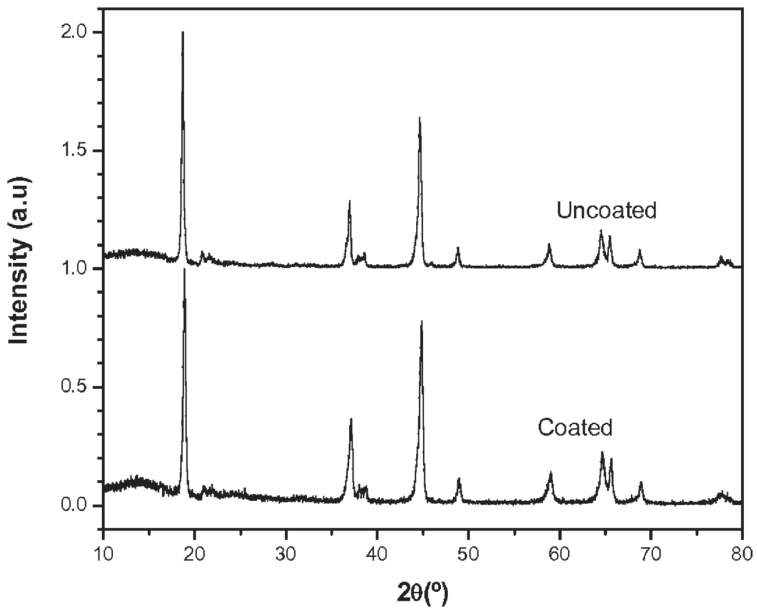
Benefits

- Carbon-coated materials can be charged and discharged faster than non-coated materials.
- Using this method, the metal oxide will not reduce to the metal species when coated with carbon.
- Carbon-coated cathode materials have improved electronic conductivity.
- With its high capacity and high current rate, carbon-coated materials are ideal for use in lithium batteries for plug-in and electric vehicles.

Applications and Industries

Coatings for electrodes used in batteries for

- Electric and plug-in hybrid electric vehicles;
- Portable electronic devices;
- Medical devices; and
- Space, aeronautical, and defense-related devices.



X-ray diffraction graph of coated (10%) and uncoated $Li_{1.2}Mn_{0.5}Ni_{0.176}Co_{0.1}O_2$.

Developmental Stage

Proof of concept

Availability

Available for licensing

Patent Information

US Published Application 12/951,284

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