

Surface Modification Agents for Lithium Batteries (ANL-08-026)

Increased safety and security from battery gas release.

The Invention

A process to modify the surface of the active material used in an electrochemical device. The modification agent can be a silane, organometallic compound, or a mixture of two or more of such compounds. Both negative and positive electrodes for lithium-ion batteries can be made from the surface-modified active materials. Surface modification can be accomplished by either adding the agent to a non-aqueous electrolyte used in constructing a battery, or by treating the materials in a gas phase or in a solution.

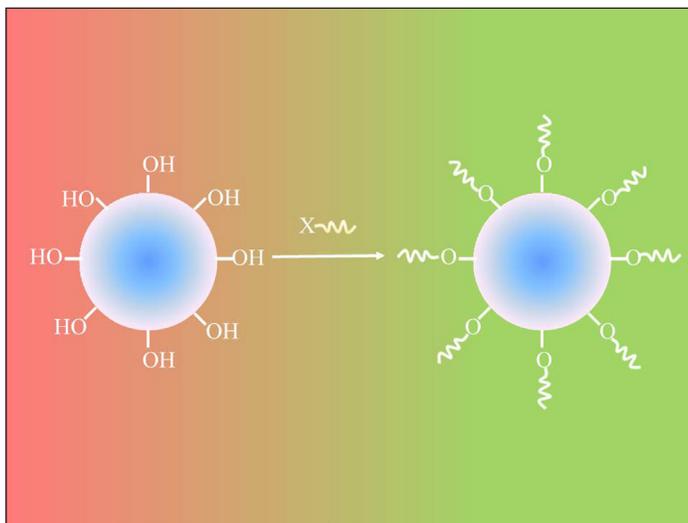
Benefits

- ▶ Increased safety and life of lithium-ion batteries, as the surface modification prevents a catalytic reaction in lithium-ion cells that generates hydrogen gas, which can lead to substantial power fade of the cell and potential explosions.
- ▶ Includes methods and molecules as additives that enable electrode modification.

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.



Schematic of surface modification for battery materials.

Developmental Stage

Reduced to practice

Availability

Available for licensing

Patent Information

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