# Aluminum doped zinc oxide coating for improved electrochemical performance of $Li_4Ti_5O_{12}$ anode

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With the increasing applications of lithium-ion batteries in energy storage and auto-motives, there are more demands to further improve their energy density, safety, rate capability and cycling stability. Spinel $Li_4Ti_5O_{12}$ has been considered as one of the most promising anode candidates for lithium-ion batteries. It possesses several advantages, 1) good $Li^+$ insertion and de-insertion reversibility with negligible structure change, as so called "zero strain" material, 2) high safety and excellent cycle stability, arising from the high discharge plateau of about 1.5 V, which avoids the battery short circuit triggered by the formation of lithium dendrites on the surface of electrodes[1]. While an inherently insulating property restrains its high rate performance[2].

In this work, we prepared $Li_4Ti_5O_{12}$ electrode coated with aluminum doped zinc oxide through megnetron sputtering, denoted as AZO-LTO. Fig. 1 shows the cycleability of AZO-LTO electrode at various current rates from 0.2 to 15 C, comparing with the raw $Li_4Ti_5O_{12}$ electrode (LTO). It can be seen that the specific capacities of AZO-LTO are higher than those of LTO at any rate, indicating an enhanced rate performance for AZO-LTO.

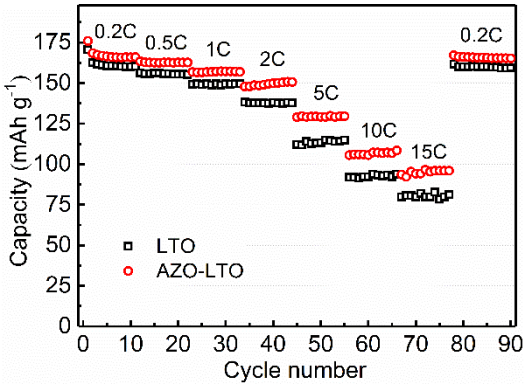


Fig. 1 Cycleability of LTO and AZO-LTO electrodes at various current rates from 0.2 to 15 C.

**References:**

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[2] C.Y. Ouyang, Z.Y. Zhong, M.S. Lei, Electrochem. Commun. 9 (2007) 1107–1112.