# Abstract Template

**Abstract Title: Use of waste SNCR catalyst powder to produce Li4Ti5O12 anode material for lithium ion battery**

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**Abstract (not more than 300 words)**

The titanium dioxide ($TiO_2$) content in waste selective non-catalytic reduction (SNCR) catalyst powder is recycled using acid and is then baked, filtered, hydrolyzed and calcined to form $TiO_2$ powder. The powder is structurally uniform with a particle size of 26 - 250 nm. The $TiO_2$ powder is reacted with $Li_2CO_3$ to produce $Li_4Ti_5O_{12}$ as an anode material for lithium ion batteries. Unreacted $TiO_2$ is observed in the $Li_4Ti_5O_{12}$ powder following sintering at 700℃ for 12 hr. However, for higher sintering temperatures in the range of 800~900℃, the $TiO_2$ disappears and is replaced by pure $Li_4Ti_5O_{12}$ phase with a particle size of approximately 50 nm. The elemental composition of the $Li_4Ti_5O_{12}$ powder is determined via energy dispersive spectroscopy (EDS) and inductively coupled plasma mass spectrometry (ICP-MS). Moreover, the crystalline phase is determined via X-ray diffraction (XRD). Finally, the surface morphology is observed using field emission scanning electron microscopy (FESEM). The $Li_4Ti_5O_{12}$ powder is assembled into a button-type battery and subjected to cyclic charge-discharge tests. The maximum discharge capacity is found to be 152.66 mAh/g, and is obtained using the $Li_4Ti_5O_{12}$ powder sintered at 850℃. The capacity retention performance (>95%) of this powder.

Keywords—*Titanium dioxide; Selective non-catalytic reduction (SNCR) catalysts; Lithium battery; Anode material*

**Professional Biography (100-150 words)**

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**Any Comments:**