

# Nitrogen-doped Si/C composite derived from Si waste as potential anode materials for Li ion batteries

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In this study, we propose a one-step method to synthesize nitrogen-doped Si/C composite as anode materials for Lithium ion batteries. The results indicate that both carbon content and nitrogen-doping content in Si play vital roles on its electronic conductivity and structural stability. XPS results indicate that about 0.7~3.7 mol.% nitrogen atoms were successfully doped in Si/C composite. N-doped Si/C composite delivered a high reversible capacity of 1237 mAh/g after 100 cycles at 0.5C, which is much higher than that of bare Si/C of 709 mAh/g. In addition, the rate capability of N-doped Si/C obtain 850 mAh/g at 1 C, which is much higher than that of bare Si/C of 690 mAh/g. Using four-point probe tests, the electronic conductivity of N-doped Si/C composite and Si/C composite electrodes were found to be 19100 and 12820 S/cm, respectively. The obtained results highly indicate that through the combination of N-doping and pitch coating, electrochemical performance of Si electrode are greatly improved.

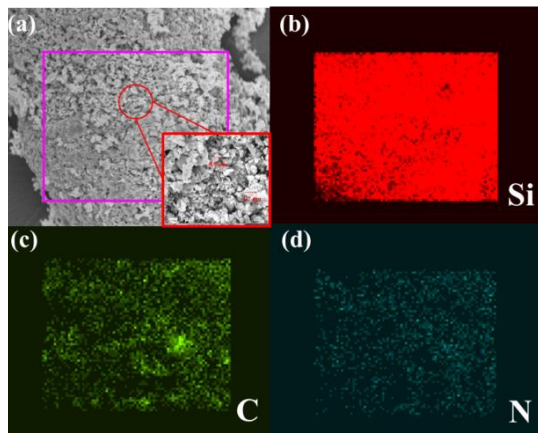


Figure 1. (a) SEM image of N-doped Si/C composite, EDS mapping of (b) Si (c) C (d) N

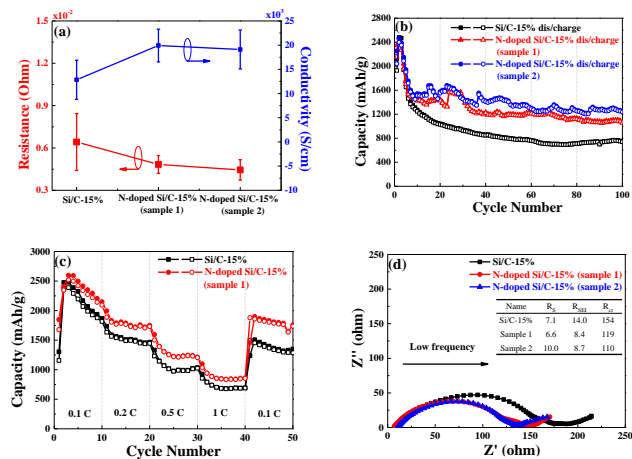


Figure 2. Electrochemical performance of Si /C-15% and N-doped Si/C-15% materials; (a) 4-points probe tests; (b) Cycle life tests; (c) Rate capability tests and (d) AC impedences of Si/C and N-doped Si/C anodes.

## References:

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