High-Performance Na-O₂ Batteries: From Liquid to Solid

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Na-O₂ batteries



EECOMOBILITY + HEVPD&D

State-of-the-art Na-O₂ cells: Poor performance and safety concerns



Review paper <u>X. Lin</u>, X. Sun, *Submitted to Nano Energy*,

Our works on Na-O₂ batteries



Progress report



Progress report-- Integrated solid electrolyte and porous cathode



- > The dense SSE layer can acts as a barrier to completely protect the Na metal from detrimental effect of O_2 , H_2O , and at the same time, avoid short circuiting caused by Na dendrites penetration.
- The highly porous structure can create sufficient pathways for gaseous oxygen transport, and provide enough voids for discharge products accommodation.

Progress report-- Integrated solid electrolyte and porous cathode



- Carbon coated porous SSE can provide active sites for oxygen reduction/evolution reactions, and enables Na-O₂ batteries with high areal specific capacity.
- The Na-O₂ battery is discharged with NaO₂ as the discharge product with high reversibility.
- The dense SSE layer can acts as a barrier to completely protect the Na metal from detrimental effect of O_2 , H_2O , and avoid short circuiting caused by dendrites
- The constructed cell can be stable runs for over 100 cycles at 200 mA g⁻¹, 200 mAh g⁻¹

Future plan



Thanks for your attention!



The Swagelok-type cell configuration.



NASICON-type $Na_{3.25}Zr_2Si_{2.25}P_{0.75}O_{12}$ solid-state electrolyte

