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Porous nitrogen doped carbon foam with excellent resilience for self-supported oxygen reduction catalyst

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Abstract: Fabrication of graphitized carbon materials (e.g. carbon nanotubes and graphene) normally entails the assistance of transition metal catalyst. In this paper, a nitrogen doped carbon foam (NCF) with both graphitized and porous carbon structure was fabricated by direct pyrolysis of melamine foam (MF) without using any transition metal catalyst. The graphitized carbon structure was possibly attributed to the triazine moieties in the MF precursor. The introduction of oxygen groups in the oxidation step resulted in the formation of large amount of micro- and mesopores and therefore high specific surface area. The NCF exhibited a three-dimensional cellular network consisting of carbon microfiber with abundant micro- and mesopores and giving rise to a specific surface area over 980 m²g⁻¹. Due to such graphitized porous structure, the NCF was demonstrated to have superior resilience, excellent electrocatalytic activity and good durability for oxygen reduction.

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