Sodium–Oxygen Battery: Steps Toward Reality

Imanol Landa-Medrano,† Chunmei Li,‡ Nagore Ortiz-Vitoriano,‡ Idoia Ruiz de Larramendi,† Javier Carrasco,‡ and Teófilo Rojo*†‡

†Departamento de Química Inorgánica, Facultad de Ciencia y Tecnología, Universidad del País Vasco UPV/EHU, 48080 Bilbao, Spain
‡CIC Energigune, Albert Einstein 48, 01510 Miñano, Álava, Spain

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*E-mail: trojo@cenergigune.com.

Rechargeable metal–oxygen batteries are receiving significant interest as a possible alternative to current state of the art lithium ion batteries due to their potential to provide higher gravimetric energies, giving significantly lighter or longer-lasting batteries. Recent advances suggest that the Na–O₂ battery, in many ways analogous to Li–O₂ yet based on the reversible formation of sodium superoxide (NaO₂), has many advantages such as a low charge overpotential (~100 mV) resulting in improved efficiency. In this Perspective, we discuss the current state of knowledge in Na–O₂ battery technology, with an emphasis on the latest experimental studies, as well as theoretical models. We offer special focus on the principle outstanding challenges and issues and address the advantages/disadvantages of the technology when compared with Li–O₂ batteries as well as other state-of-the-art battery technologies. We finish by detailing the direction required to make Na–O₂ batteries both commercially and technologically viable.