

Effect of Heteroatoms doped Nanoporous Carbon for Aqueous Zinc-Bromine Battery: Mainly on types of binder and slurry compositions

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As interest in renewable energy increases, the importance of batteries that store surplus power is also accelerating. However, frequent ignition issues with the lithium-ion secondary battery have been arising. One of the next-generation batteries, Zinc-Bromine based aqueous flow batteries, are being actively studied based on advantages of high safety and environmental benignity. However, there is an exorbitant price for flow battery due to the use of a membrane, an electrolyte tank, and a pump. In order to eliminate the shortcoming, this research introduced a form of membraneless and flowless systems.

In this study, nanoporous carbon materials doped with nitrogen and boron heteroatoms was synthesized, and coated on graphite felt. Differences were observed when carbon was coated with various binders (such as PTFE, PVDF and PVA) and different slurry compositions. Also, the contact angle for $ZnBr_2$ electrolyte and the battery cycle test showed the interaction between electrodes and electrolyte. This interaction could be explained not only by the effect of the binder, but also by the interaction with the coated carbon.