Department of **Materials Science & Engineering** seminar series 2019

All-solid-state sodium ion batteries realized by sulfide electrolytes

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Venue: **EA-06-03**

Abstract

The intrinsic non-flammability and achievable cost reduction of all-solid-state sodium-ion-batteries (ASSNIBs) makes them promising candidates for next generation energy storage applications. Ceramic ion conducting electrolyte, the key component to ASSNIBs, should possess high ionic conductivity and compatible interfacial properties. To achieve highly conductive solid electrolytes, crystal structures with flat energy landscapes and populated atomic defects are favored. In this study, we explored a series of electrolytes containing $[SbS_4]^{3+}$ polyanions. Large Sb cores and more polarizable S (compared with O) opened chances to achieving higher conductivity values and even solution processability. To address the reduction stability induced by Sb^{5+} ions, interfacial stability between solid electrolytes and anode materials were also studied. Finally, ASSNIBs embedded with the synthesized sulfide electrolytes were assembled to demonstrate their applicability in energy storage device.

Zhang Xin received his master's degree in Department of Materials Science and Engineering in National University of Singapore. He is now a Ph.D. candidate in Department of MSE under the supervision of A/P Stefan Adams. His current research mainly focuses on the sodium ion conductors and their application in all-solid-state batteries.

ALL ARE WELCOME!

Host: A/P Xue Junmin