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Electronic and ionic conduction in oxo-vanadium arsenates VICTORIA SOGHOMONIAN, Virginia Tech, Department of Physics — Electrically conducting microporous zeolite-like or zeoate frameworks are largely unstudied as electronic materials, but may offer new avenues in catalysis and in electrical energy storage applications. Zeolites and zeoates are characterized by the presence on nanoscale channels and cavities delineated by their crystalline framework, and occur naturally or can be synthesized by inorganic methods. The material under discussion here, an oxo-vanadium arsenate system, combines the properties of the well known but electrically insulating microporous zeolites, with an electronically active framework. We present the structure and the experimentally measured electronic and ionic conductivities of the materials system, the temperature dependences of the conductivities, and discuss possible electronic and ionic conduction mechanisms at play in empty frameworks and ion-exchanged frameworks. We also discuss how microporous electrically conducting frameworks can find use in electrical energy storage, and compare the zeoate frameworks in such applications to other materials systems such as mesoporous carbon.

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