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Dear Editorial Board,

Journal of Nuclear Materials

On behalf of my co-authors and myself, I am hereby submitting our manuscript, entitled ``A modified Embedded-Atom Method interatomic potential for uranium-silicide”, for publication in the *Journal of Nuclear Materials*. This work provides the first interatomic potential capable of describing the uranium-silicide (U-Si) system.

Accident-tolerant fuel (ATF) is being considered as a potential fuel type for future and existing light-water reactors (LWRs). ATFs aim to provide additional coping time in the event of an accident (such as a loss of coolant accident) due to the inherent properties of the fuel, while maintaining good operational characteristics. Uranium-Silicide (U-Si), and particularly U3Si2, is being considered as a fuel candidate in ATFs.

The ability to understand and model microstructural changes throughout the lifetime of the fuel is critical in developing fuel performance modeling codes. However, the current experimental data available for U-Si fuels is rather limited. Molecular dynamics (MD), utilizing interatomic potentials, can be used to calculate relevant properties above 0 K on a nanosecond time and nanometer spatial scale that are currently unknown or unknowable via experiments. Information obtained from molecular statics and dynamics simulations can then be input into higher level modeling methodologies such as phase field, kinetic Monte Carlo or continuum level finite element modeling. In this manner, physics-based multiscale microstructural evolution models can be generated.

Thus, development of an interatomic potential to describe the U-Si system is a critical step in branching time and length scales with the long-term goal of developing a descriptive and predictive nuclear fuel performance code.

There are no previous or concurrent submissions related to this work.

Sincerely,

Benjamin Beeler