

# Uranium Nitride Corrosion

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## Abstract

Abstract stuff

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## 1. Introduction

- Call for accident tolerant fuel

## 2. Review

To better understand uranium nitride corrosion, Jolkkonen et al. [1] and Johnson et al. [2] have analyzed UN subjected to steam or air.

Lu et al. [3] and Lopes et al. [4] each investigated a method to mitigate UN corrosion.

Density functional theory has been used in several studies to probe the atomistic UN corrosion mechanism, notably by groups Bo et al. [5] and Bocharov et al. [6].

## 3. Discussion

Arkush and Liu report NO while Jolkkonen does not - environment? Combination of nitriding, adding dopants, intermetallics Nitriding reduces interactiong at room temperature, however at higher temperature higher stoichiometric UN decays to UN. Add intermetallics for ease of fabrication, nitride for room temp handling

Bo et al. [5] used DFT towards determining the initiating of UN corrosion, but while they report optimally water species and adsorption sites, this does little to reveal a reaction mechanism like (1). Computational studies at odds with experiment: experiment changes starting conditions, comp changes type of study

	Starting Material	Temperature	Pressure
Jolkkonen et al. [1]	UN pellets (77 - 97%TD)	400 - 425 °C	0.05 MPa
Johnson et al. [2]	UN powder ( $\approx$ 20 mg)	800 °C	not reported
Lu et al. [3]	UN films	AFG	UHV
Lopes et al. [4]	UN pellets (95 - 99 % TD)	300 °C	9 MPa

## 4. Summary

## References

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