

# Uranium diboride, the potential candidates of ATF, feature and application

## L<sup>A</sup>T<sub>E</sub>X

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### Abstract

It is universally acknowledged that power generation is most fundamental facility required by every industry, as almost all things require electricity to work. Among all the methods of electricity generation, nuclear power always faces considerable scrutiny. Undoubtedly, nuclear power brings about feelings of fear and unknown horror, especially after the accidents at Fukushima and Chernobyl. Such concerns are not unreasonable, as people's fear of nuclear power is a good measure to prevent accidents from happening. However, Taiwan people are too afraid of using this technology, turns out the result is miss out the opportunity to improve our ecosystem and make it more environmentally friendly. In this research, I would put the focus on the potentially fuel, Uranium diboride ( $UB_2$ ), an interesting fuel that nowadays are research to be an ATF candidate fuel. Its physical properties also make it suitable for use in GEN-IV reactors, which require high standards to reaction. All of these factors make  $UB_2$  show on my eyes, and this research aims to explore its potential.

Keywords: ATF, Uranium diboride, GEN-IV reactors

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### 1. Introduction

Uranium diboride is potentially material which on closely debating to be the next generation re-actors fuel, expecially known as ATF.  $UB_2$  have unique talent to play a important role in these fu- ture plan. ATF purpose almost seems like make increasing the reactors power up-rates, longer cy- cle lengths, improved performance due to lowered thermal gradients across the fuel pellet reduced stored energy in the core, and allow

for increased coping time during accident scenarios.

### 2. Physical properties

In many candidate of ATFs material, the Uranium diboride has higher Uranium density than the others. Also, it has better thermal conduc- tivity that make itself have lower fuel centre-line temperatures on working, result in many positive effect such like: reduce

the rate of temperature- dependent release of fission products, reduce the energy stored inside the fuel (This properties also is the most important that the UB2 need.)