

## Research Activities of Alternative Fuel Cladding Materials for APR1400 at Khalifa University

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The UAE's nuclear energy program, which began in 2008 with the publication of the "UAE Policy on the Peaceful Use of Nuclear Energy" document, has prioritized the safe, reliable, and economic operation of its APR-1400 nuclear power plants. Following the Fukushima events, the development of Accident Tolerant Fuels (ATFs) has become a focus in the nuclear fuel research and development community. ATFs are designed to withstand a significant loss of active cooling in the reactor core for a longer time period, resulting in increased safety compared to the existing fuel system while maintaining or improving normal operation performance. The purpose of this study is to investigate the feasibility of using ATFs as nuclear fuel in the APR1400 and assess their impact on the plant's safety and operation parameters. To accomplish this goal, a variety of analyses and assessments will be necessary, including neutronics, thermal-hydraulic, thermo-mechanical/chemical, and fuel performance analyses for multiple candidate ATF concepts. The investigation focuses on the APR1400 reactor, which is the reactor of choice in the UAE. The research aims to provide a review of ongoing research and potential ATF concepts for use in the near future in APR1400 nuclear power plants.

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