

2021F_05_RADOVIC

Research Development Fund – Fall 2021 Application Template

Submission Deadline: **12:00PM CDT Monday – October 4, 2021**, to rdf@tamu.edu

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Application Title: The Acquisition of an Ultra-High Temperature Furnace for Synthesis and Thermal Treatment of Advanced Materials in Vacuum or Inert Atmosphere

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Key Participating Units: COE, COS

RDF Amount Requested (\$): \$388,850.00

Executive Summary

This proposal is addressing core needs for enhancing the discovery, synthesis and thermal treatment of novel materials. Recent investments at TAMU have significantly advanced our capabilities to characterize and test different types of materials on campus. However, key missing elements to our growing research on materials include facilities for materials synthesis and processing, especially when it requires extremely high temperatures (>2000 °C) and well controlled environments. The growing need for new components and devices that can withstand more demanding and harsher service condition, commonly requires materials that have to be synthesized or processed at extremely high temperatures. Those materials are particular crucial for future advances in aero-space, defense, transportation and energy generation sectors. At TAMU, we have significant research expertise in development of new materials for all those sectors, but our synthesis and processing capabilities are limited to small samples only to 1600°C. Therefore, the acquisition of tools that will allow their synthesis and processing will elevate the researcher at TAMU to the top level. We are seeking to enhance our materials synthesis and processing capabilities by acquiring a state-of-the-art furnace that can operate up to 2200°C in vacuum or inert gasses (Ar, He) with the relatively large volume of 8 L. This instrument will not only support both current and new research, primarily across COE and COS, but also local industry and industrial partners. In addition, the instrument would strongly support recent new faculty hires across the campus by attracting top experts in the area of materials processing and manufacturing. Capabilities of materials processing and synthesis at such a high temperatures are still scarce, especially in academic institutions, making the addition of this resource not only important locally, but regionally and nationally as well. The requested instrument will be placed in in the Materials Development and Characterization Center (MDC²), that is sustainable, self-supported user facility housing various materials processing and characterization equipment. Furnace placement in the MDC² ensures that an existing infrastructure is already in place to allow easy access and training of the internal and external users, as well as good maintenance of this tool.