RECENT FY18/FY19 NTP MATERIALS DEVELOPMENT ACTIVITIES AT NASA MARSHAL SPACE FLIGHT CENTER

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Nuclear thermal propulsion (NTP) is under investigation by the National Aeronautics and Space Administration (NASA) for in-space propulsion activities beyond low earth orbit (LEO). It is well established that through the use of a hydrogen propellant and high engine operating temperature (2350 – 3100 K), NTP has the potential to enable comparable thrust levels (10 - 250 klbf) to traditional chemical engines with much higher specific impulses (800 – 1100 s). These are desirable attributes to reduce transit times for crewed missions to interplanetary destinations, such as Mars. The successful development of NTP technologies for in-space propulsion is dependent upon the manufacture and demonstration of relevant in-reactor material systems which are capable of withstanding the demanding operating conditions of the engine, such as corrosive high temperature, flowing hydrogen environment, intense irradiation fluxes, thermal shock and cycling incurred over multiple burns, etc. NASA Marshall Space Flight Center is currently developing fabrication methodologies to support the successful development of in-reactor components. This lightning talk will overview recent materials development activities at NASA Marshall Space Flight Center, including most recent fabrication and testing efforts.