Material Advantage

Meeting: 4/16/2021

Meeting time: [11:00 – 11:30] am

Key Notes:

* Nathan Jerred came to talk about his experience at INL as a materials engineer
* Undergrad in MSE and metallurgy engineering
* PhD in nuclear engineering
* In the Advanced Fuels Manufacturing and Development Group at INL
* New approaches to nuclear engineering with space applications
* SLA (Stereolithography) process
	+ Laser sketches each pattern in UV curable resin
	+ Resins with ceramic powder
	+ Used for complex geometries
	+ Have to be debinded and sintered
* Digital Light Processing (DLP)
	+ Uses 405nm light to cure an entire layer at once
	+ Higher solid loading for resin
	+ Complex ceramic based designs
* Laser Engineering Net shaping (LENS)
	+ Used for non-conventional fuel geometries
	+ Can be used for variable internal structuring and variable surface finishing
* Spark Plasma Sintering (SPS)
	+ Used for fast consolidation of materials to near theoretical densities
* NASA TREAT Irradiation
	+ Nuclear Thermal Propulsion (NTP)
	+ For manned spaceflight beyond the moon