Plasma Processes, Inc.

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Innovative W Alloys for Advanced Propulsion Systems

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Description and Objectives

•Increase ductility and strength of tungsten using innovative W-Re-HfC alloy

• Reduce cost and fabrication time for propulsion components using net shape VPS processes

Material	UTS, MPa 1000?C	UTS, MPa 2000?C
Pure W	240	45
W-4Re	360	80
W-4Re-HfC	720	200

Non-Eroding W-Re-HfC throats will be hot fire tested at ATK-Thiokol at no charge to Phase I. Advanced high powdered propulsion components to be fabricated and hot fire tested in Phase II.

Approach

•Develop mechanically alloyed and plasma spheroidized W-Re-HfC powder

• VPS W-Re-HfC samples for characterization and hoop tensile testing

• Hot fire test VPS W-Re-HfC throat

ATK ALLIANT TECHSYSTEMS

Schedule and Deliverables

•6 month program

•Microstructural and hoop tensile test data

• Hot fire test data for W-Re-HfC throat

NASA & Commercial Applications

•High powered electrical, nuclear, beamed energy propulsion components. microgravity crucibles

•Tactical and ballistic nozzles, heat pipes, fuel cells