

March 4, 2024



USPlasma, Inc.

4467 Technology Drive

College Park, MD 20742

**Subject:** HB 1220 / SB 0960 “Maryland Clean Energy Center - Climate Technology Founder's Fund” Wednesday, March 6 - 1:00 PM -House Appropriations Committee -120 - 6 Bladen Street - Annapolis, MD

***USPlasma’s mission is Science for a Better Life and Healthy Environment.***

At USPlasma, Inc. our vision is to electrify manufacturing with renewable electricity while minimizing and recycling waste, reducing GHS emission, and enabling new chemistry with reduced manufacturing cost.

Faculties at the UMD recently developed a novel impactful platform technology that can be leveraged to address mankind's challenges, such as GHS reduction, addressing food insecurity and clean energy. Our plasma-based reactors can overcome the shortcomings of past plasma processes. The tip-enhanced carbon electrode design enables the formation of uniform, stable, large-area, and voluminous plasma at atmospheric pressure with a record-low breakdown voltage, less than 50 V, while simultaneously achieving tunable ultra-high temperatures up to 8,000 K. It lends itself to safe, flexible, scalable, inexpensive, and easy to operate reactor design with the ability to cycle the reactor temperature between 1,000 K to 8,000 K in less than one second.

This revolutionary technology opens the door to new chemistries, including difficult-to-achieve non-equilibrium syntheses, high-quality bulk production processes of a wide range of extreme and emerging materials, and production processes that can replace the legacy production processes while improving product quality, reducing cost, and carbon footprint. Examples include but are not limited to, the conversion of  $N_2$  to fertilizer, biomass to useful carbon at the temperature of 5,000 K for 10 second residence time, or production of high-quality amorphous high-melting oxides such as MgO, ultra-high-temperature ceramic such as Hf(C, N) hafnium carbonitride, that is very challenging to prepare because of its record high melting point ( $>4,000$  K) and nitrogen dissociation, and production of high-quality refractory metal alloys with ultra-high melting points such as W-1.5Nb-0.5Ti or production of higher quality cement powder at higher throughput with less  $CO_2$  emission as compared to

the conventional rotating kilns and production of high-quality refractory high entropy alloys, RHEA, that improve the thermal efficiency of natural gas turbines and jet engines by 7% resulting in energy saving equivalent to about 116 million barrels of petroleum per year and a significant reduction in CO<sub>2</sub> emission, about 23 million metric tons, equivalent to emission from 5 million cars, or biomass to useful carbon used in production of anode in battery.

USPlasma Inc. started with a one-woman scientist, supported by faculty founders, but without significant capital, legal, and business management support. In the span of six months, we managed to develop strategic partnerships with three industry supply chain partners. In addition, USPlasma received a \$100,000 award and are hoping to raise \$300,000 convertible note. Furthermore, we are expecting to move into UMD's rental laboratory space to de-risk and validate our technology. Because of this progress, we are in the midst of hiring an experienced Ph.D. chief technology officer and a full-time technician. We are also negotiating a marketing, manufacturing, and sales deal with a company in California to quickly commercialize our laboratory research plasma reactor for R&D purposes to get this impact technology in the hands of researchers in universities and laboratories in the USA to advance the cause of science and technology. Finally, we are also in the midst of negotiation with a major company in the USA as an industry supplier, commercialization partner and equity investor.

USPlasma would not have been able to achieve the above progress without the full commitment, dedicated and caring support of MEIA. They not only provided us with initial legal and business support but also held weekly meetings with us to guide us through the business challenges and our endeavors to connect with potential industry partners, equity investors, and HR procurement. I should also mention the high value I received from MEIA entrepreneurial periodic seminars covering important topics crucial to the success of a new startup.

Here on behalf of USPlasma, I would like to take the opportunity to thank MEIA team, Wade Haerle, Mike Ducker, and Emily Sheppard for their unwavering help and support as I and the faculty-founders are navigating through this journey.

Best Regards,

Dr. Hamideh Soltani