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The Naval Research Laboratory Wins FLC Mid-Atlantic Region Top Technology Transfer Award for Transparent Spinel Ceramic Armor

The Mid-Atlantic Region of the Federal Laboratory Consortium this year presented the first place, Regional Excellence in Technology Transfer Award to Dr. Jasbinder (Jas) S. Sanghera, Dr. Ishwar (Ish) D. Aggarwal, Dr. Guillermo Villalobos, and Dr. Shyam Bayya of the Naval Research Laboratory (NRL) for work on "Transparent Spinel Ceramic Armor."

The researchers have developed and commercialized transparent spinel ceramic, which provides a cost and performance advantage over materials such as glass, ZnS, and sapphire that have traditionally been used in military and commercial applications. Not only is spinel transparent in the visible, but it also transmits certain wavelengths in the infrared which sapphire and glass cannot – an important property for sensor and laser systems. Spinel also has excellent mechanical properties. It has comparable strength to sapphire but is considerably stronger than glass and ZnS. The manufacturing costs for spinel are relatively low due to the improved yield, attributed to the high reproducibility, and because the entire process only takes a few days compared with many months required to grow high quality single crystal sapphire. Also, the process is readily scalable to considerably larger sizes than sapphire as well as complex shapes such as domes, which are not possible with sapphire.

This technology, licensed to MER Corporation, has received multiple order contracts and is being sampled for both government and commercial applications. Further, transparent spinel is on a path to realize global commercial distribution via a joint venture between MER Corp. and Mitsubishi of Japan.

The successful and rapid transfer of this novel ceramic technology from the Navy to MER Corp. has created, for the first time, a US supplier of high optical quality spinel ceramic. The government will benefit from the availability of inexpensive, high optical quality and strong/rugged spinel which will enable lightweight transparent armor for military personnel and platform protection, thin and rugged windows for high energy lasers, and domes for aircraft sensor systems. The public sector will benefit from cost-effective improvements to existing protective equipment for fire and rescue workers – as well as enhanced performance and ruggedness of consumer electronics. Because of its reduced cost for manufacturing as well as improved optical and mechanical performance, this material is expected to replace glass and ZnS in many applications, as well as allow for some applications simply impossible to address with previous technologies, and has the potential to become a multi-billion dollar business.

One of the most coveted awards in the field of technology transfer; the FLC awards for Excellence in Technology Transfer recognize laboratory employees who have accomplished outstanding work in the process of transferring Federally-developed technology to the marketplace. The award was made on September 21 at the region's annual meeting.

The Federal Laboratory Consortium is comprised of the technology transfer offices of all of the Federal laboratories throughout the country while its Mid-Atlantic Region focuses on the 70 Federal laboratories in DC, DE, MD, PA, VA and WV.

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