

Heat-resistant ceramic coatings studied

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AFOSR-supported research at the University of Arizona is investigating high temperature resistant ceramic coatings that will provide thermal protection for Air Force hypersonic flight vehicles.

The research team led by Dr. Erica Corral of the University of Arizona is using advanced [chemical synthesis](#) and ceramic processing methods to process the ceramic compositions onto [carbon composites](#), which are the materials used to fabricate lightweight and high-strength aerospace vehicles.

"The major steps in advancing this technology are based on relevant testing of the ceramic coatings under extreme temperature, heat flux and gaseous species environments," said Dr. Corral.

Even now there are challenges in performing some of the relevant tests that require simulating extreme aerothermal environments where temperatures on the surface of the aircraft can go as high as 2800 degrees C or one-half the surface temperature of the sun.

The researchers have also been harnessing the power of the sun and focusing the [solar radiation](#) at a specific [heat flux](#) to investigate high-temperature oxidation resistance that their coatings provide.

Scientists anticipate future hypersonic vehicles with ultra-high temperature ceramic coatings will be capable of sustained flight at Mach 7 or more, making it possible to travel from Los Angeles to New York in 30 minutes.

In the process of leading this research effort, Dr. Corral has been named the most promising doctoral engineer or scientist this year by the Hispanic Engineer National Achievement Awards Conference, or HENAAC. She also received an Air Force Office of Scientific Research Young Investigator Program Award in 2010.

She said she was fortunate to have excellent mentors and technical collaborators during her academic and postdoctoral training and career.

"There are many individuals that I should thank for their support and for their willingness to help train a young person like me in materials science," she said. "For example, my former and current program directors from AFOSR, Dr. Joan Fuller and Dr. Ali Sayir, have been very supportive of my early research efforts by providing the funding for me to do my research at the University of Arizona and my colleagues."

Dr. Corral noted she is also grateful for the mentorship received from Sandia National and Labs, Rice University and The University of Texas at El Paso are the basis of support for her research.

Provided by Air Force Office of Scientific Research

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