



**CALIFORNIA STATE SCIENCE FAIR
2003 PROJECT SUMMARY**

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Project Title Conductive Polymers as an Environmentally Safe Commercial and Space Applicable Material	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Do intrinsically conductive polymers offer a more cost- efficient replacement material in comparison to traditional space and commercial materials, while at the same time performing the same functions, or even a combination of a functions performed by several traditional space applied materials and corrosion preventing materials used currently.</p> <p>Methods/Materials The following tests, for this experiment were the following: salt spray testing to determine the anti-corrosive properties of polyaniline (which would both determine its durability on Earth prior to launch, as well as whether polyaniline can be used as a replacement for the harmful hexavalent chrome paint used in modern aircraft to protect corrosion), thermal cycling to determine polyaniline's durability in temperature extremes, and surface resistance testing to verify that this conductive polymer can prevent electrostatic discharge from potentially damaging circuitry and instrumentation within a spacecraft.</p> <p>Results The results were as follows: in the salt spray testing, which was performed for one week, polyaniline successfully protected steel and aluminum coupons from oxidization (a finding that was further established this chemical analyzation); in the heat cycling, which alternated for approximately ten hours the temperatures of #100°F and 257°F, the coupons covered with polyaniline were intact (though scanning electron microscope pictures showed minute amounts of the polyaniline had worn off); and surface resistivity testing produced results of a resistance of 10^6 to 10^8 ohms, which fit precisely within the guidelines of commercial satellite specifications.</p> <p>Conclusions/Discussion The results of corrosion testing were very promising and as of now, the results point in the right direction for a possible space use of polyaniline, in the future I hope to perform more tests to determine is acceptability as a space applied material: outgassing, more electron microscope analyzations, and solar radiation testing.</p>	
Summary Statement Whether or not conductive polymers are a good substitute for materials used commercially to prevent corrosion as well as in space.	
Help Received Father contacted people to help in testing.	