U.S. Department of Energy
Categorical Exclusion Determination Form

Program or Field Office:	Office of Energy Efficiency and Renewable Energy: Phase III Xlerator Program
Funding Opportunity Number	DE-FOA-0000397
Applicant Name:	Strategic Polymer Sciences, Inc
Location:	State College, PA
Project Title	Compact High Temperature DC Bus Capacitors for Electric Vehicles Using High Performance Electroactive Polymers

Proposed Action or Project Description — American Recovery and Reinvestment Act: ☐

Strategic Polymer Sciences, Inc., proposes to develop compact film capacitors with high dielectric constant and high temperature stability using its proprietary electroactive polymer dielectric compositions. The capacitors would be able to operate at above 140 degrees C with a size that is more than 60% smaller than current polypropylene (PP) DC bus capacitors. Power electronics are a key technology for hybrid and plug-in electric drive vehicles (EDV) and represent 20% of the material costs. Direct current (DC) bus capacitors are one of the critical components in EDV power inverters and they can occupy approximately 35% of the inverter volume, contribute to approximately 23% of the weight, and add approximately 25% of the cost. Current PP film capacitors cannot be reliably operated above 105 degrees C, and an additional cooling system must be added to cool down the capacitors. During Phase I, Strategic Polymer Sciences developed electroactive polymer dielectric compositions with dielectric constant above 5 and melting temperature above 240 degrees C, and they also accumulated unique experience in producing ultrathin free-standing polymer capacitor film. During Phase II, Strategic Polymer Sciences developed advanced compact DC bus film capacitors for electric vehicle power inverters using novel electroactive polymer dielectric compositions with high temperature stability (greater than 140 degrees C), high dielectric constant, low dielectric loss tangent, low leakage current. Prototype capacitors would be developed for customer test at technology readiness level 7 (system/subsystem model or prototype demonstration in a relevant environment). The Electro-Active Polymer (EAP) film capacitors would meet the DOE FreedomCAR targets and enable significant reduction in electric vehicle power inverter size and cost.

Conditions: None

Categorical Exclusion(s) Applied: B3.6, B5.1

*-For the complete DOE National Environmental Policy Act regulations regarding categorical exclusions, see Subpart D of 10 CFR10 21

This action would not: threaten a violation of applicable statutory, regulatory, or permit requirements for environment, safety, and health, including DOE and/or Executive Orders; require siting, construction, or major expansion of waste storage, disposal, recovery, or treatment facilities, but may include such categorically excluded facilities; disturb hazardous substances, pollutants, contaminants, or CERCLA-excluded petroleum and natural gas products that pre-exist in the environment such that there would be uncontrolled or unpermitted releases; or adversely affect environmentally sensitive resources (including but not limited to those listed in paragraph B.(4)) of Appendix B to Subpart D of 10 CFR 1021). Furthermore, there are no extraordinary circumstances related to this action that may affect the significance of the environmental effects of the action; this action is not "connected" to other actions with potentially significant impacts, is not related to other proposed actions with cumulatively significant impacts, and is not precluded by 40 CFR 1506.1 or 10 CFR 1021.211.

Based on my review of information conveyed to me and in my possession (or attached) concerning the proposed action, as NEPA Compliance Officer (as authorized under DOE Order 451.1B), I have determined that the proposed action fits within the specified class(es) of action, the other regulatory requirements set forth above are met, and the proposed action is hereby categorically excluded from further NEPA review.

ORO NEPA Compliance Officer **James L. Elmore** Date Determined: 9/17/2010

Record ID: 17