High Temperature Sealing Materials that Self Repairs

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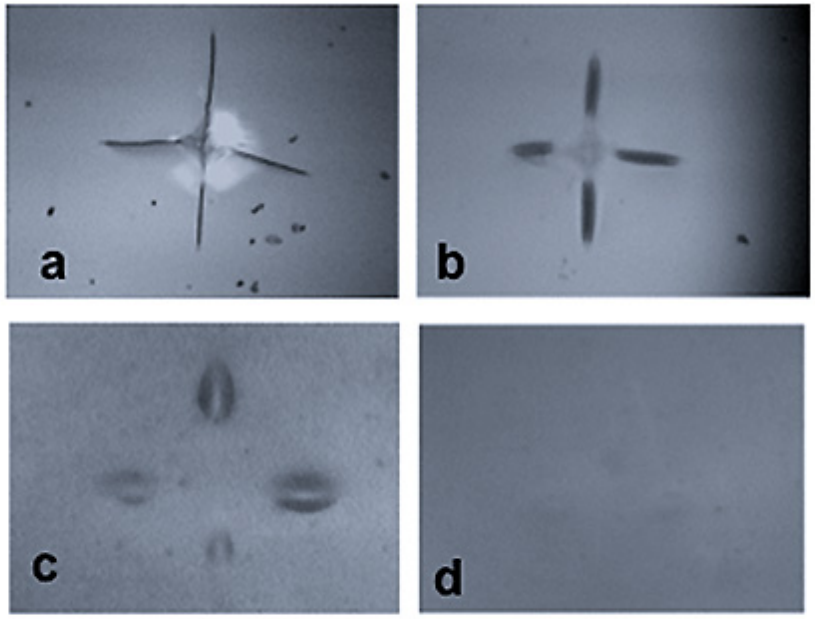
Outcome: researcher at University of Cincinnati have created a novel glass material for sealing that self repairs.

Impact: The self-repairable sealing materials are expected to improve reliability, efficiency and economic viability of fuel cell technology for energy production.

Explanation: Glasses are used for sealing and joining materials in a myriad of technological applications. Glass seals are also needed for new and more efficient energy producing devices such as solid oxide fuel cells (SOFCs) for conservation of limited natural resources and for efficient energy production. The seals for SOFCs function at very high temperatures and are susceptible to cracking in service. The research work is expected to develop a new class of glass and glass-composites that self-repair cracks or damage (see photos) thereby providing long-life and cost-effective solutions to seals for SOFCs. The fundamental science of self-repair is being studied in support of this project.



Photos showing a cracked glass in (a) and progressive self repair ability (b-d) with time at high temperature. Photo in (d) shows complete repair a few minutes.