Ionic Polyamide and Polyamide-Imide Materials and Methods of Use

THE UNIVERSITY OF ALABAMA | Research & Economic Development
Office for Innovation & Commercialization

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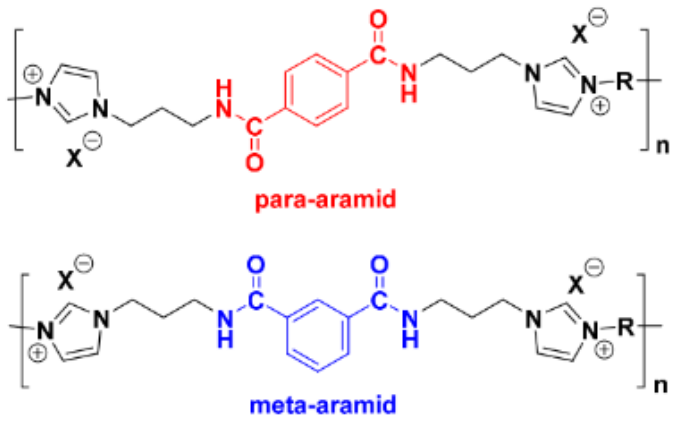
The Problem:

Current polyamide materials are produced from a diacid and diamine, which are used in a variety of applications. However, the tunability of these polyamides and their structures is limited. Because of this, the potential with materials they are applied to is capped. An increase in tunability of polyamide structures would allow for greater opportunities for these materials to be explored.

The Solution:

This technology adds a dihalide group to the current polyamide structure, resulting in an ionic polyamide. An imidazole-based diamide is produced from the condensation of an imidazole-amine derivative with a diacid (chloride). This imidazole-based product is then reacted with a dihalide compound resulting in an ionic polyamide.



Ionic polyamide products with differing configurations.

Benefits:

- Greatly increased tunability of the ionic polyamide structure
- Unlocks thousands of more polyamide chemical structures to be produced from simple transformations
- Opens up the possibility of new properties
- Can be applied to 3D printing purposes
- Resulting materials can be used in high performance materials (e.g., bulletproof materials)

INVENTORS

Dr. Jason Bara

Professor, Department of Chemical and Biological Engineering

Dr. Jason Bara received his PhD in Chemical Engineering from the University of Colorado at Boulder in 2007. Dr. Bara's areas of research include "green" chemistry, 3-D printing, CO2 capture processes, polymers and soft materials initiative, and ionic liquids. Dr. Bara has earned the ASEE Ray W. Fahien Award for Excellence in Chemical Engineering Education (2018) along with the FRI/John G. Kunesh Award, AIChE Separations Deivision (2015) and others.

Dr. Katie O'Harra

Assistant Professor, College of Engineering and Honors College: EPIC

Dr. Katie O'Harra received her PhD in Chemical Engineering from the University of Alabama. Dr. O'Harra's research focused on the design of high-performance ionic materials for membrane-based gas separations and additive manufacturing applications.

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