**Prof Michael Aziz**

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Prof Michael J Aziz received his Ph.D. in Applied Physics from Harvard in 1983. He has been a member of the faculty at what is now the Harvard John A. Paulson School of Engineering and Applied Sciences since he joined in 1986 and is now Gene and Tracy Sykes Professor of Materials and Energy Technologies.

Prof Aziz has made significant contributions to a number of fields in applied physics and materials science. He is a Fellow of the American Physical Society, the American Association for the Advancement of Science, and the Materials Research Society, and the recipient of the Bruce Chalmers Award from the Minerals, Metals, and Materials Society. Among his research interests are novel materials and processes for energy technology and greenhouse gas mitigation. Most recently, he is leading a team that is developing redox flow batteries based on organic molecules. Prof Aziz is also the Faculty Coordinator for Harvard's University-Wide Graduate Consortium on Energy and Environment, for which he developed a quantitative course on Energy Technology for a group of students in diverse disciplines. He is coauthoring a textbook, "Introduction to Energy Technology: Depletable and Renewable", to be published by Wiley-VCH.

## Organic Aqueous Redox Flow Batteries for Massive Electrical Energy Storage

Abstract:

The ability to store large amounts of electrical energy is of increasing importance with the growing fraction of electricity generation from intermittent renewable sources such as wind and solar. Flow batteries show promise because the designer can independently scale the power (electrode area) and energy (arbitrarily large storage volume) components of the system by maintaining all electro-active species in fluids. Wide-scale utilization of flow batteries is limited by the abundance and cost of these materials, particularly those utilizing redox-active metals such as vanadium or precious metal electrocatalysts. We have developed high performance flow batteries based on the aqueous redox behavior of small organic and organometallic molecules. These redox active materials can be very inexpensive and exhibit rapid redox kinetics and long lifetimes. This new approach could enable massive electrical energy storage at greatly reduced cost.