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Method for Benzoyl peroxide Reduction Afterglow Electrochemiluminescence

Co-electroprecipitation “freezes” radical salts to deliver brighter, minutes-long afterglow ECL post-bias, enabling tunable chemiluminescence for sensing, printable electronics, and confined reactions.

Researchers at Purdue University have uncovered a strategy to further synthesize more reactive radical salts, effectively freezing radicals in space and time for future use in applications such as biosensing. This breakthrough principle increases the lifetime of electrochemiluminescence (ECL) by orders of magnitude. ECL is a technique in which electrical energy is applied to a system and transformed into chemical energy, which then decays to emit light. This novel method of inducing ECL increases both the brightness and length of electroless chemiluminescence after the potential difference is ceased. This paves a path forward for tuning these radical precipitation systems with solution-phase chemistry. Applications include polymer synthesis, reaction confinement, printable electronics, and bio-sensing.

Technology Validation:

Researchers demonstrated the method's ability to increase the lifetime of electrochemiluminescence (ECL) by employing the co-electroprecipitation of two reactants during the simultaneous electro-reduction of these reactants. The electrode was shown to generate a concentration profile exceeding the solubility of the given reactants, promoting precipitant formation. After the application of a potential, the leads were disconnected, and the precipitant electrolessly chemiluminesced for minutes during dissolution.

Advantages:

-Opens a path for using organic solvents in ECL reactions

-Increases both the brightness and length of electroless chemiluminescence after the potential is ended

Applications:

Technology ID
2025-DICK-71267

Category
Energy & Power Systems/Energy Storage
Biotechnology & Life Sciences/Analytical & Diagnostic Instrumentation
Chemicals & Advanced Materials/Materials Processing & Manufacturing Technologies

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View online

-Polymer synthesis

-Reaction confinement

-Printable electronics

-Bio-sensing

TRL: 3

Intellectual Property:

Provisional-Gov. Funding, 2025-07-29, United States

Keywords: afterglow, benzoate, benzoyl peroxide, Chemistry and Chemical Analysis, Electrochemiluminescence, Electrochemistry, polymer synthesis, radicals