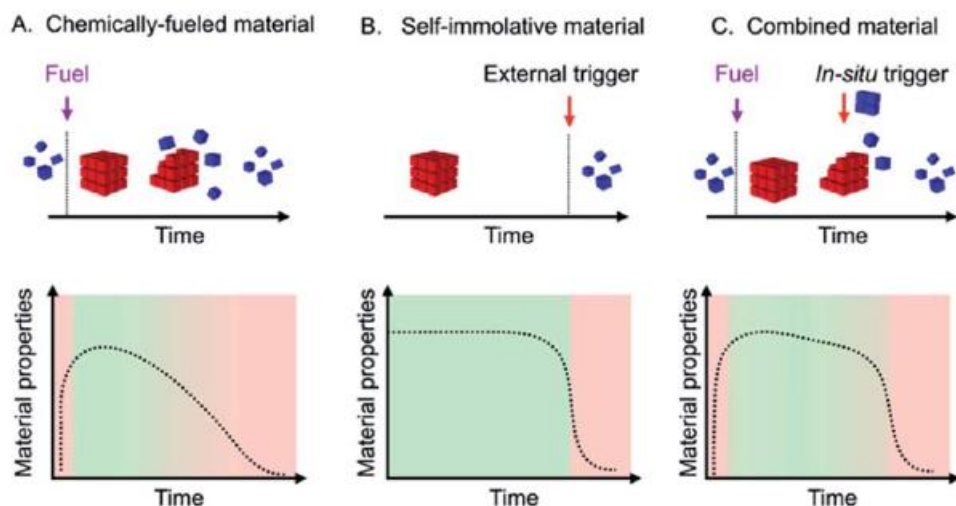


Chemically fueled materials with a self-immolative mechanism: transient materials with a fast on/off response

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DOI: 10.1039/d1sc02561a



Who are the corresponding authors, and what are their research areas?

Job Boekhoven- A professor in Supramolecular Chemistry at the Technical University of Munich(TUM). His group pioneered in engineering a carbodiimide fuel-driven dicarboxylate-based transient materials. They use such systems to study/mimic the synthesis of life and develop transient materials.

What is the main claim of the article?

Claim- Chemically fueled materials usually have a first-order decay profile, and a sharp on/off response is achieved only through an external trigger. The authors claim to develop a chemically fueled system with a fast on/off response which does not need an external trigger.

Relevance- Authors have shown potential uses of the system in drug delivery and self-erasing ink.

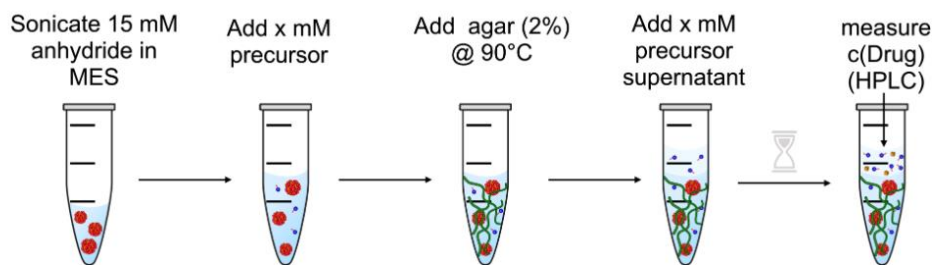
How is it demonstrated?

The precursor, product and fuel concentrations were determined by analytical HPLC(calibration curves of all the compounds in triplicates). The turbidity of the systems was determined by grey value analysis in the ImageJ software on the webcam images of the system. The results from the HPLC were fitted using a theoretical kinetic model.

What are the typical experimental conditions?

-The experiments were done in 0.2M MES pH 6 buffer with a precursor concentration of 20mM. The EDC (1M) stock solution was prepared fresh every day.

-For the self-erasing Ink studies, Polyacrylamide gel was used. The EDC was spray deposited by an atomizer.



Schematic representation of the drug release studies

Which are the key related papers?

The same group published drug release agents with different release profile using the same system.

- Wanzke, C.; Tena-Solsona, M.; Rieß, B.; Tebcharani, L.; Boekhoven, J. Active Droplets in a Hydrogel Release Drugs with a Constant and Tunable Rate. *Mater. Horiz.* **2020**, 7 (5), 1397–1403. <https://doi.org/10.1039/C9MH01822K>.
- Tebcharani, L.; Wanzke, C.; Lutz, T. M.; Rodon-Fores, J.; Lieleg, O.; Boekhoven, J. Emulsions of Hydrolyzable Oils for the Zero-Order Release of Hydrophobic Drugs. *Journal of Controlled Release* **2021**, 339, 498–505. <https://doi.org/10.1016/j.jconrel.2021.10.014>.

Additional comments, including additional elements of interest

I find the tunability of EDC-fueled succinic acid derivative systems fascinating. Changes in parameters such as the concentrations of the compounds result in significant changes in behaviour, and this work exemplifies this notion. Just by exploiting the surfactant nature of the precursor and ensuring that the precursor concentration can reach greater than the CMC one can have a self-immolating behaviour in addition to the zero-order nature of the decay of the anhydride.