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Photocatalysis as a tool for the development of certified reference materials: a case study in university technology transfer

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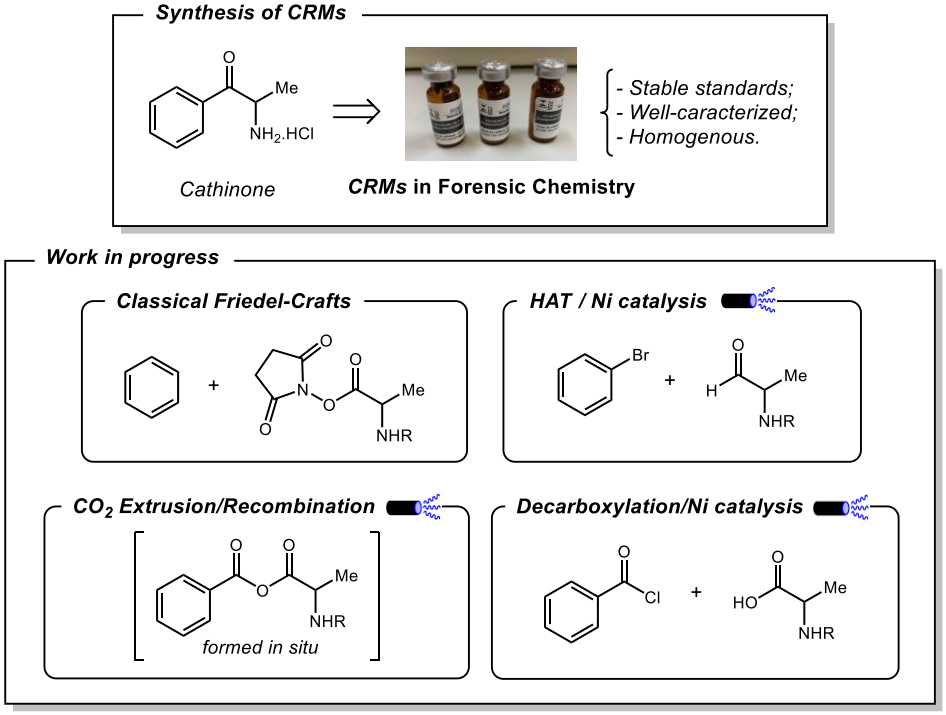
ABSTRACT

Certified Reference Materials (CRMs) are well-characterized, stable and homogeneous standards used in forensic analyses to ensure accuracy, traceability and consistency in measurements and identifications.[1] The national production of CRMs is crucial for reducing import costs, ensuring availability and adapting materials to local needs. In this study, we are investigating photocatalytic strategies for the synthesis of cathinones, amphetamine derivatives which are currently not produced in Brazil, aiming to establish a straightforward method for their production and certification for forensic chemistry applications.



Scheme 1. Photocatalytic strategies for synthesis of cathinone CRM

Our initial efforts to obtain these derivatives involved a Friedel-Crafts reaction as a key step, using toxic benzene, which furnished the product with low yield. In contrast, the photocatalytic coupling of readily available and inexpensive protected alanine or its aldehyde offers a more straightforward approach. Preliminary results using metallaphotoredox catalysis have been promising. Further studies to explore CO_2 extrusion and coupling via nickel-photoredox catalysis with acyl chlorides are under investigation.[2-6]

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