



Breaking Down Commercial Oxygenated Polymers Using Versatile Tetraalkylammonium Hydroxide

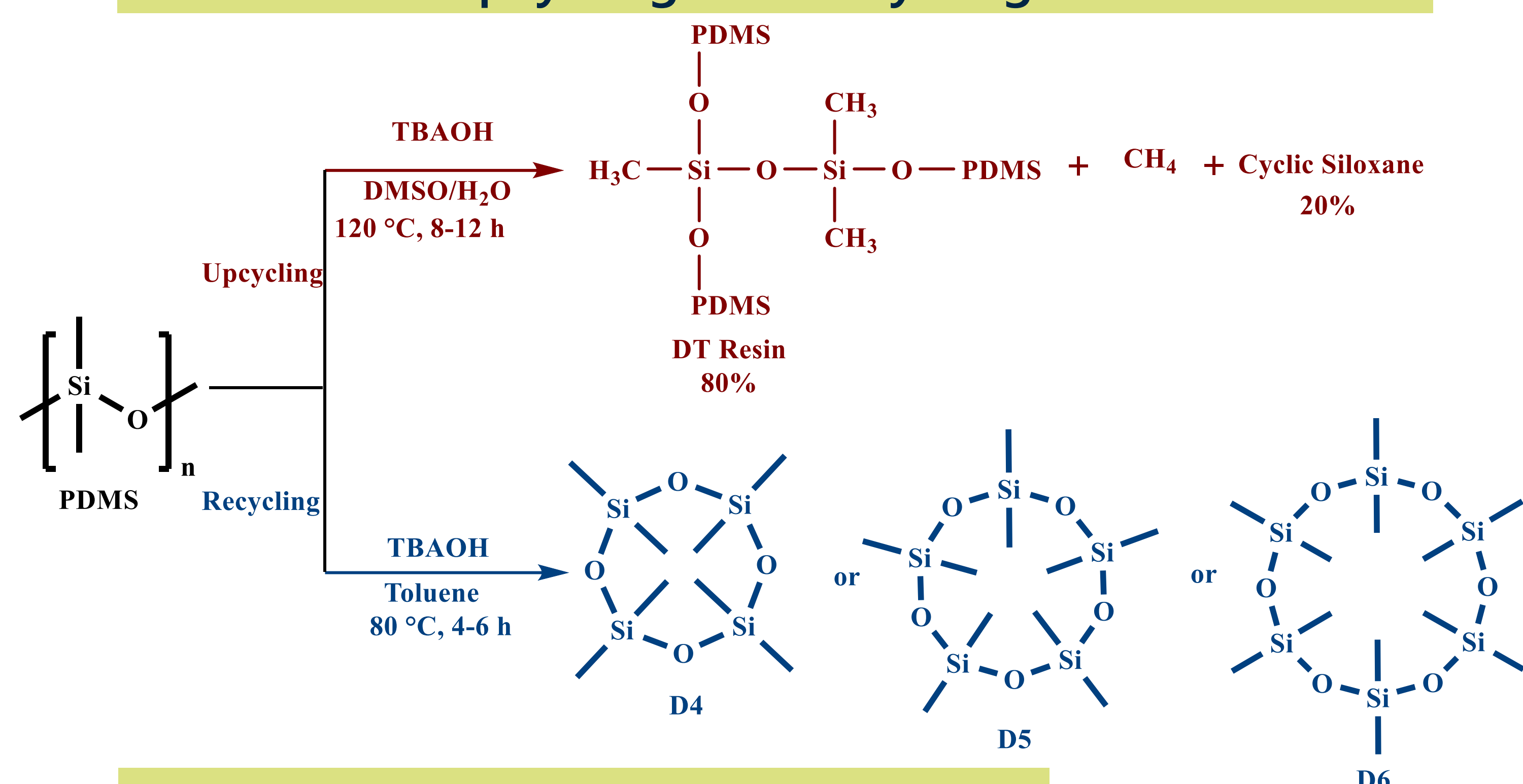
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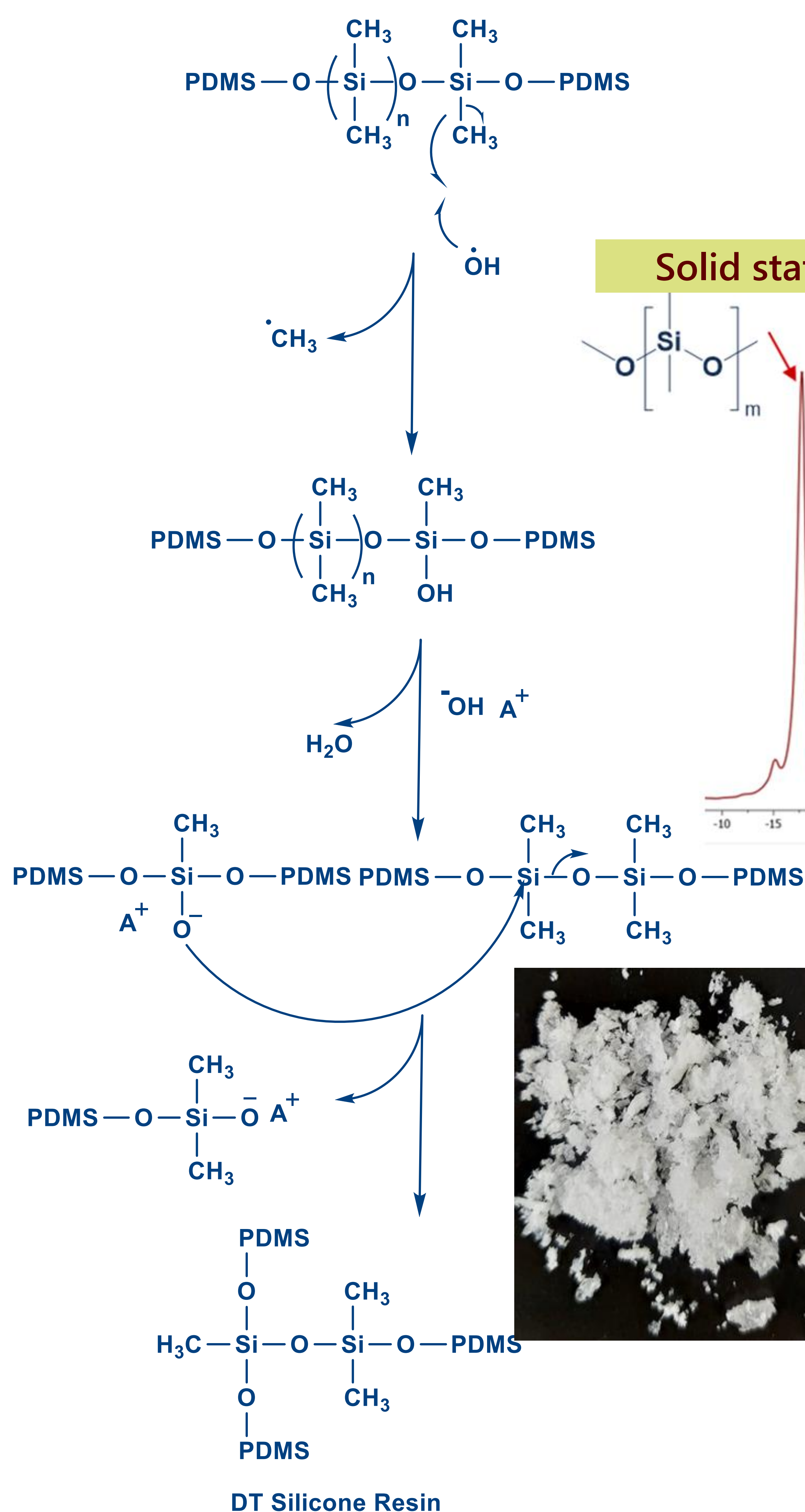
Introduction

Plastics are ubiquitous materials in modern society, valued for their durability, versatility and light weight. However, their prevalent use has led to substantial environmental challenges, including the accumulation of persistent waste and reliance on non-renewable petrochemical feedstocks. With demand for plastic continuing to grow, there is an urgent need to develop sustainable solutions for managing its life cycle.¹ This poster explores a simple and effective method for recycling and upcycling of commercial polymers using simple and effective tetraalkylammonium hydroxide. Our aim is to transform the end-of-life fate of plastics into opportunities for a more circular and sustainable future.²

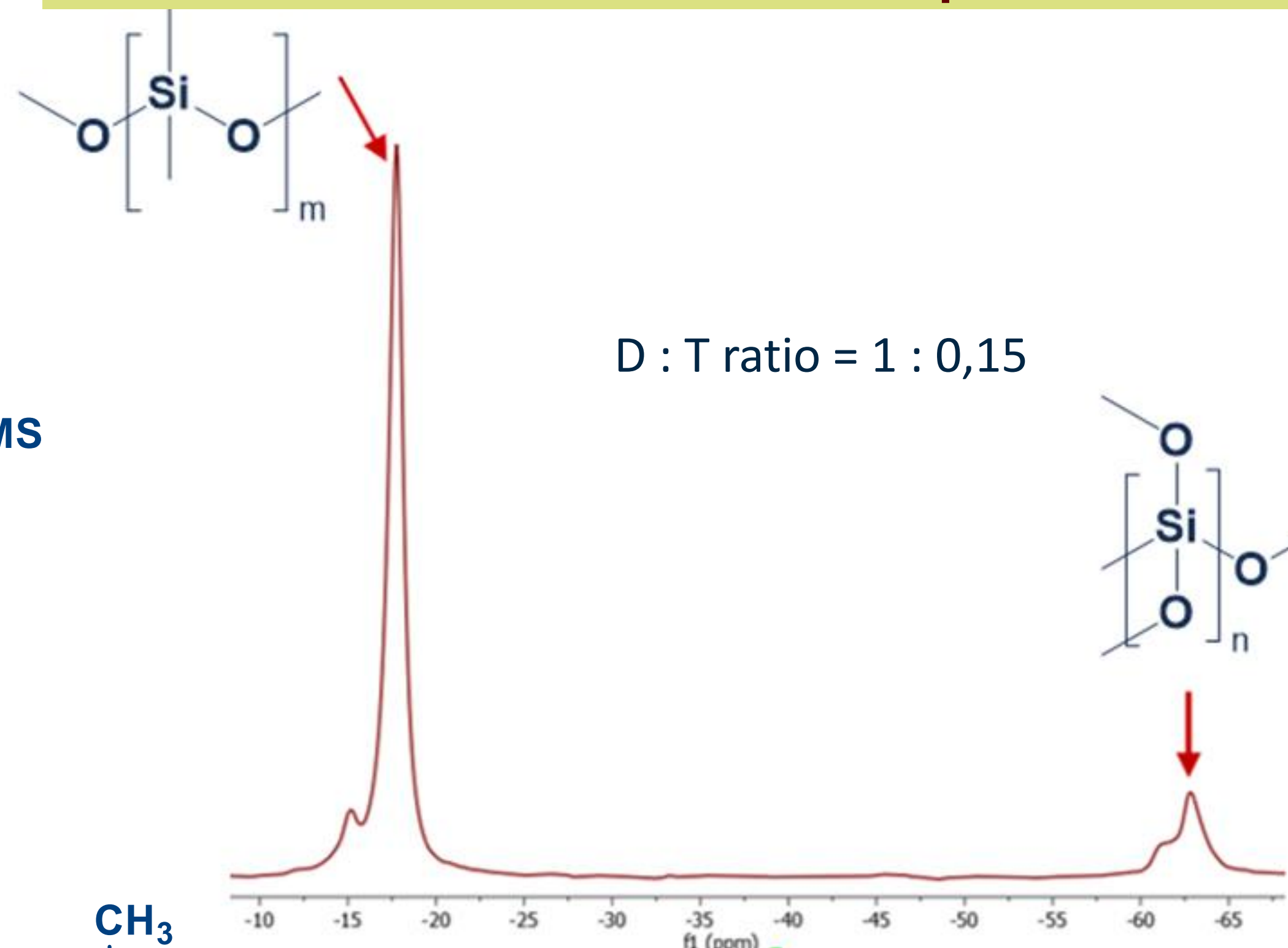
Upcycling and Recycling of Silicones



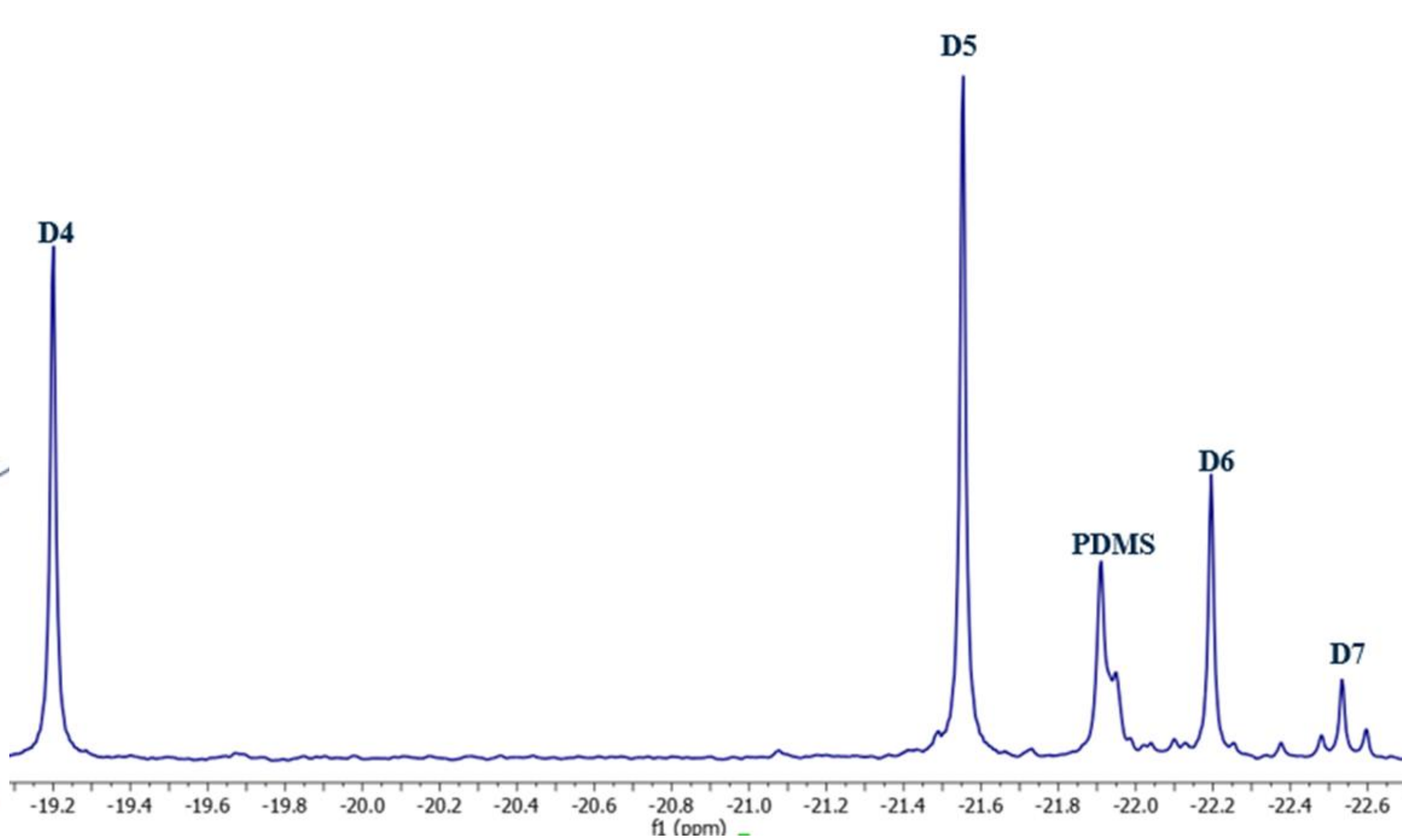
Proposed Upcycling Mechanism



Solid state ²⁹Si NMR of Prepared Resin



²⁹Si NMR of Depolymerisation Product



Conclusion

In this contribution, we describe a straightforward, cost-effective method for upcycling and recycling silicone waste. Under different reaction conditions, we can obtain crosslinked methyl silicone resins and cyclic siloxane. Using the same tetraalkyl ammonium hydroxide catalyst, we can depolymerize commercially available polyethylene terephthalate and polycarbonate via a transesterification method.

References

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