

Total synthesis of a novel barium boron yttride compound

Renée L. Webster^{1*} & Nathan A. S. Webster^{1*}

Barium boron yttride compounds are of considerable interest due to their potential for application to literally all current and future human endeavours. Barium boron yttrides are produced in significant numbers (in excess of 300,000 per year in Australia), but despite their ubiquity, there is no evidence in the literature that an ideal specimen has ever been synthesised. Here we report the first example of barium boron yttride to be synthesised in our laboratory. The synthetic route is neither novel nor facile, nor readily scalable, and the product is unlikely to be economically viable for 2 decades or more. However, we hope to demonstrate the realisation of an exceptionally high quality specimen of barium boron yttride from readily available starting materials. The total synthesis of barium boron yttride from the Webster Laboratory is expected to be complete in early August.

The broad utility of barium boron yttrides represents a rich resource for chemical processes across all industries. Barium boron yttrides also have prospective applications in diverse fields including chemistry, physics, biology, geology and even the lesser pursuits of the arts, social sciences, and humanities. Needless to say, if barium boron yttride compounds did not possess such wide-reaching and fascinating properties, their synthesis would not have made such an impact on history. Persistent synthesis and study of these systems has been facilitated by developments in synthetic methodology that have enabled the relentless preparation of barium boron yttrides, supported to varying degrees by government policy geared towards stimulating economic growth, and a somewhat inexplicable desire to increase production of barium boron yttrides despite indications that numbers are reaching levels that are likely to become untenable in the

future. However, they do display a finite lifetime and in order to fully explore the undoubtedly rich chemistry of barium boron yttrides and their impact on humankind, there is a need to constantly synthesise new examples. The intrinsically high potential of a sample from this specific synthetic route is undeniable and as each sample is unique, will exhibit different activity and give rise to distinctive properties from other examples previously reported in the literature. In this context, barium boron yttrides are particularly attractive targets for investigation despite their natural abundance, high cost, and inherent instability, particularly in the early stages of their existence. Such unique properties conducive to the successes of humanity have ensured barium boron yttrides remain some of the most valuable compounds known not only now, but also into the future.



Figure 1 | Representative sonogram of the barium boron yttride compound in this study as characterised by diagnostic medical sonography. The sample demonstrates external morphology consistent with the detection of a heterogametic karyotype via next generation sequencing.

¹Department of Chemistry, Webster Laboratory, Melbourne, Victoria, 3000, Australia