LOOKING BACK TO GUIDE US ON HOW TO MOVE FORWARD FOR GEOPOLYMERS

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Making geopolymers and alkali activated materials with specific properties requires skill and a thorough understanding of the process. The trial and error approach used by many researchers may result in an acceptable product but there is little or no understanding of why it worked and how to improve or optimise the product. It also leaves potential producers without quality control of feedstock hence limited quality assurance on product. This presentation will look back at how the geopolymer group at Curtin University improved its understanding of geopolymer technology via development of XRD, SEM and related analytical techniques. Examples on how geopolymers were made with very high compressive strength on one hand and on the other hand with impressive fire resistance will be described.

However, this is not the end of the story. Ultimately the goal is to commercialise geopolymers and for this to happen we must conduct rigorous life cycle analysis and embodied energy assessments to be confident that these materials are competitive and sustainable. One way to ensure low embodied energy is to explore alternate activators and sources of alumina and silica. When alternate precursors such as Bayer liquor have been used to manufacture geopolymers they prove to have a very low embodied energy and are potentially less expensive. The use of Bayer liquor for geopolymers will be described in detail and examples provided on how this approach may be viewed as a way forward for the field of geopolymers for specific products.