

In the Loop

Using chemistry to design and develop processes which will create a circular economy



Research shows that nearly 60 million litres of paint, and almost 100 million paint containers are wasted each year in the UK. Nimtech is a social enterprise, which employs disadvantaged and workless personnel to provide recycling services to a major paint manufacturer - Crown Paints. Graduate researcher Josh Wardrop has been working to support Nimtech in identifying the potentially recyclable waste and to determine a route for possible resource recovery with the goal of a reducing the environmental burden of the manufacturing process - an economic benefit for Crown - whilst also opening up the possibility of new revenue streams for Nimtech, aiding in their overall growth.

The nature and size of Crown's business inevitably results in the production of a considerable volume of waste, a large proportion of which is rather unsurprisingly very similar to their paint. Crown as a responsible manufacturer is keen to increase the sustainability of its business and is working with Nimtech to address this. The relationship between the two is symbiotic and extremely well maintained with Crown providing Nimtech accommodation on their sites whilst Nimtech supports Crown with waste minimisation, segregation and disposal.

One of the higher volume waste streams is wastewater (effluent) from Crown's two manufacturing sites based at Darwen and Hull, which totals approximately 30,000 Tonnes or the equivalent of 12 Olympic Size swimming pools annually. Despite the huge quantities, the effluent is able to be pre-treated and cheaply pre-treated at plants at both sites before being piped for secondary water treatment. Interestingly, Crown's effluent treatment plants



also produce a by-product from this process themselves, which although currently regarded as waste has potential value which is yet to be utilised. The project has worked to help reduce the volume of this effluent at source whilst investigating possible uses for the byproduct.

Another waste stream with particular interest is “off batch” and surplus paint; currently Nimtech segregate and bulk this before sending it for consignment with landfill. Though the quantity of this is much less than the effluent its volume is still substantial (approximately 120 tonnes per year) and unfortunately as paint has such a varied chemical composition of biocides, polymers, solvents, surfactants and inorganic components which make it intrinsically difficult to reprocess, recycle or even treat. A fundamental grasp of the chemistry of paint is therefore required to identify and access alternative treatments for this waste.

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The partnership with Lancaster University has provided Nimtech with a full time Graduate Researcher to focus solely on this project for a year, spending up to 50% of his time at the business partner to gain a fully comprehensive overview of the nature of the problem and of that of the businesses. Access to a researcher provides Nimtech the opportunity to assess the composition of Crown’s waste and the possible reuse of this; opening a gateway for potential products with economic incentives for both companies. Crown has been very supportive of the project providing a wealth of knowledge of their industry, products and processes, which are essential for this endeavour to succeed. Their assistance in giving access to their development and analysis labs has been particularly beneficial

Nimtech Limited is a social enterprise committed to improving recycling and to help people back into employment. The Centre for Global Eco-Innovation has been working with Nimtech to assist a major industrial manufacturer find added value in their waste streams. The aim is to identify, extract, re-use and recycle components of the waste with a view to creating and designing new products which may be returned to the supply chain, a ‘Circular economy’.

and has been supplemented by further support from the university’s Chemistry department allowing for a full understanding of the nature of the waste.

The cooperation of the three parties is essential for Nimtech to access the resources to undertake a major R&D project, which has the potential to quadruple the scope of their business within the next two years, through the opening of new potential markets whilst also providing huge economic and sustainability incentives for their associate, Crown. This collaboration supports the ambition of solving real sustainability issues facing the social enterprise, which with access and support has great potential for growth. Regular meetings with members of this partnership has also forged a strong relationship between the University and these businesses creating an environment where industrial problems can be managed effectively whilst in an academic setting; with access to relevant facilities, expertise and resources from all parties to really get the best possible solution.



Josh Wardrop | Graduate researcher