



The reactor uses solar energy and plant waste to convert acrylonitrile to adiponitrile, a precursor material used to make Nylon | Photo source [Public Domain Pictures from Pixabay](#)

[Innovation](#) > [Manufacturing](#) > [Chemical manufacturing process that uses solar energy](#)

CHEMICAL MANUFACTURING PROCESS THAT USES SOLAR ENERGY

 MANUFACTURING

Researchers are working to replace energy-intensive chemical manufacturing processes with solar-driven reactions

Spotted: A team of researchers from New York University's Tandon School of Engineering is developing a chemical manufacturing processes that use sustainable, solar-powered reactions, rather than energy-intensive, fossil fuel-dependent processes.

The team, led by Miguel Modestino, assistant professor of chemical and biomolecular engineering, has designed a reactor that uses solar energy and plant waste to convert acrylonitrile to adiponitrile, a precursor material used in the manufacture of Nylon. The process relies on organic electrosynthesis, a method of production which uses renewable energy to power chemical reactions.

In 2018, Modestino and Tandon doctoral students Daniela Blanco and Myrian Sbeiti launched startup Sunthetics in order to scale and market the technology.

"The opportunity to launch startups and commercialise technologies like this one make our work more tangible and help us understand what is needed to bring lab-scale technologies to large-scale scenarios," Blanco said.

Thus far, they have been able to produce the Nylon intermediaries using 30 per cent less power, 30 per cent fewer raw materials and producing 30 per cent less waste and carbon dioxide.

Replacing carbon-intensive energy with renewable sources for organic electrosynthesis is not as simple as swapping out machinery. This is because the process also relies on increasing the

electrochemical stability of the electrolyte solutions used, improving the solubility of organic molecules in the solutions, and preventing unwanted reactions during the processes.

Suntech and Tandon join a host of other companies that are working to make chemical synthesis more carbon-friendly. Innovations in this space recently covered by Springwise include methods that use [bacteria](#) or [microbial fermentation](#) to synthesise dyes.

Explore More: [Science Innovations](#) | [Sustainability Innovations](#)

4th March 2020

Email: modestino@nyu.edu

Website: engineering.nyu.edu

[Download PDF](#)

Takeaway:

The global chemical industry currently uses around one-quarter of the world's energy, and this is mostly in the form of the fossil fuel-generated heat needed to drive thermochemical reactions. According to Modestino, organic electrosynthesis could have a major impact on the pharmaceutical and petrochemicals sector, where the process could also be used to develop new methods of upgrading methane, and could “[provide a path towards the electrification of the chemical industry](#)”.