



## HyCat (Pty) Ltd - Innovation in hydrogen fuel cell power

HyCat (Pty) Ltd, is an intellectual property (IP) holding company commercialising hydrogen fuel cell IP specifically in the segment.

Its primary goal is to develop the fuel cell supply chain in South Africa with local manufacturing partners to provide the most technologically advanced products and components to a global market. In doing this, HyCat will unlock value addition for SA's platinum resources and create manufacturing jobs, a service industry and secondary businesses. This will be achieved through the licensing of South African IP, as well as in-licensed IP from global players, with which the SA IP will be integrated to ensure that the ventures are immediately at the global forefront.

Fuel cells (FC) are one of the promising power sources for replacing internal combustion engines powered by fossil fuels. They are highly efficient, quiet, clean, and maintenance free electricity generators that use hydrogen and air as fuel.

### Benefits

The initial focus at HyCat will be on establishing a catalyst and membrane electrode assembly (MEA) supplier. The HyCat metal based gas-diffusion electrode is cheaper and more durable than the commonly used carbon fibre based electrode, which also relies on a complicated manufacturing process. Two patent applications have been filed to date<sup>1</sup>, with several others in preparation.

Several additional innovative developments are underway; including novel materials for electrolyte membranes, compact fuel cell assembly structures, and novel gasket systems for metal based electrodes. These technologies can make the fuel cells smaller with increased power and durability. In addition to this, the fuel cell design aims to remove certain sub-systems surrounding the fuel cell, resulting in system cost reduction, which is the most crucial issue for fuel cell related companies.

Key objectives include:

- Commercialisation of SA research and IP output from the DST HySA/Catalysis Centre of Competence at UCT in collaboration with HySA partner, Mintek;
- Having a major impact on platinum group metal beneficiation, sales of MEAs with HySA catalysts must be achieved. HySA has set a target to meet 25% of the global hydrogen and fuel cell catalyst demand by 2020 and to enter the lucrative automotive MEA market. HyCat will strive to achieve this goal;
- Creation of jobs for highly skilled scientists and engineers who will be able to enter the workforce in fuel cells in South Africa;
- Creation of a fuel cell supply chain, exploiting South African IP, through an integrated network of companies with complementary skills. Secondary business opportunities will arise from commercialisation, such as fuel distribution, service and maintenance jobs and service providers; and
- Partnering strategically with global players and in-license additional fuel cell technologies that can be integrated with SA innovations.

<sup>1</sup> Tanaka, S. A Clamp Assembly for a Fuel Cell Stack and a Method of Assembling a Fuel Cell Stack. Provisional Patent Application Britain 1320838.4

Hussain, N., Tanaka, S. Fuel Cell MEA with Combined Metal Gas Diffusion Layer and Microporous Layer. Provisional Patent Application Britain 1405659.2



## Market

Potential customers include the aerospace and automotive industries, both of which require high performance, 20 year durability, and low cost materials. The technologies currently under development at HySA/Catalysis (that will be commercialised by HyCat) are predicted to meet the requirements of these industries in the future.

## Intellectual Property Status

HyCat (Pty) Ltd was registered in 2014 and is currently a 100% UCT owned spin-off company. Whilst it was established primarily as an IP holding company to commercialise the hydrogen fuel cell IP emanating from the DST HySA/Catalysis Centre of Competence at UCT, the company will collaborate closely with HySA partner, Mintek who are creating associated IP to align the commercialisation initiatives through licensing.

Importantly, HyCat will partner strategically with global players and in-license additional fuel cell technologies that can be integrated with South African innovations. Two important partnerships have already been negotiated with international companies that are dependent on approval of a funding application that is undergoing due diligence.

A number of opportunities exist:

- Licensing of relevant fuel cell IP to HyCat
- Investment in the various ventures as the fuel cell supply chain is established in South Africa
- Business development partner and opportunities for joint ventures where IP is licensed from HyCat
- South African manufacturers interested in becoming involved in manufacturing fuel cell components, etc.

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