

Research Programme To Investigate Hydrogen's Impact On Refractories

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Work is due to start on research examining the potential impact on industrial processes when using hydrogen as an alternative fuel source.

The three-year research agreement between the Materials Processing Institute (MPI), Trent Refractories and Kanthal will focus on the effect of hydrogen on refractories, the heat resistant materials that form the linings for high-temperature furnaces, crucibles, ladles, and kilns used primarily in the iron and steel industry.

It will also test a range of electrical elements for use in high temperature applications to discover any advances that need to be made to ensure full operating demands are fulfilled under an aggressive hydrogen atmosphere.

The initial phase will involve the testing of refractory materials supplied by Scunthorpe-headquartered Trent Refractories to mitigate any degradation caused by hydrogen.

According to MPI, samples will undergo a complex and advanced range of testing at the Institute in hydrogen-rich atmospheres, including microscopy and porosity tests.

For their part, Swedish industrial heating technology company Kanthal is seeking to advance the use of electric furnaces and green steel. Teesside-based MPI will also test a series of electrical elements designed by Kanthal that can tolerate hydrogen's high heating values at its hydrogen research facilities. It will further investigate and test new materials to ensure they are industry ready as clean hydrogen is further introduced across industrial processes over the next few years.

In a statement, Chris McDonald, CEO of MPI, said: "The results of this collaborative research programme could have far-reaching effects given the range of industries that depend on refractory solutions, including iron and steel, aluminium, glass, power generation, petrochemicals and chemicals, and cement.

"Hydrogen is widely used here at the Institute, and it is crucial that we assess how it is used to help deliver long term solutions that shape and support the UK's transition to a low carbon economy."

Bob James, technical collaboration lead at the Institute, added: "It's already proven that hydrogen is an alternative clean fuel source capable of powering the majority of industrial processes. However, research is essential to assess how hydrogen may impact on the processes themselves, including its effect on refractory lining systems, the corrosion of certain compositions, and accelerated wear."