Metal Hydride for Hydrogen Storage transcript

Title: Alex Bevan - Metal Hydride for Hydrogen Storage

Duration: 4.51 mins

Speaker Names:

S1 Voiceover

S2 Professor Rex Harris, Professor of Material Science, School of Metallurgy and Materials.

S3 Dr Alex Bevan, Research Fellow, School of Metallurgy and Materials.

S4 Lydia Pickering, Doctoral Researcher, School of Metallurgy and Materials.

Transcript start

S1 Research into alternative energy methods is happening the world over. Hydrogen, being an important part of this process.

S2 A new direction for Society but it's one we'll have to take because of the exhaustion of fossil fuels, which is something around 2030 before all the oil runs out.

S1 The School of Metallurgy and Materials at the University of Birmingham is heavily involved in looking at the applications to be made using hydrogen, in particular researching new ways to store hydrogen within metal hydrides. Metal hydrides are materials which deal very effectively with hydrogen gas at room temperature. Stored correctly and then heated, the hydrogen pressure can be increased, creating a metal hydride compressor. These compressors have no moving parts so hydrogen can be compressed more efficiently, cleanly and reliably, an application which could be used in commercial operations such as transport and energy storage. Alex Bevan and his team had just four months to get everything ready for a showcase event in front of the great and the good of hydrogen energy research.

S3 From when the components started arriving, we started to assemble these almost immediately into our compressor. Then we started testing the various components to make sure they met with expectations and they were up to manufacturers' requirements. We identified one or two issues when it came to transferring the gas from first stage to second stage. There was a little bit of contamination that was identified in one of the solenoid valves. We cleared that, corrected that problem and managed to successfully test the compressor up to 600 bar, which was the limit of our second stage pressure transducer.

S1 Alex was not on his own in putting all of this together.

S3 Lydia has been invaluable in helping to design this compressor.

S4 I'm a second year PhD student working in the hydrogen materials groups at Birmingham University and what I'm doing is I'm looking at materials which are suitable to be used as part of this high pressure hybrid system and I'm looking at different combinations, so varying the compositions to try and tailor the pressures which it works best at and the temperatures.

S1 All of this research will hopefully lead to some real life energy solutions.

S3 If you can compress hydrogen in a non-mechanical way with these materials, these metal hydrides are very well known for their durability and cyclability, then you can get a very long life compressor which will deliver extremely high purity hydrogen at high pressures. We were able to showcase our finished compressor at the UK SHEC Hydrogen meeting at Birmingham University. At this meeting there were academics and research students working in the field of hydrogen storage. There was also a lot of interest from industry which was present at this event so we successfully demonstrated this compressor could be built and it is operational.

S4 So far we've had quite a lot of positive reactions to the compressor. A few people have been interested in how it works and how you're able to compress the hydrogen using the two stores so so far it's worked out well.

S1 Rex Harris, Professor of Material Science at the University of Birmingham recognises the merits of the team's endeavours.

S2 For cars where you need maybe 350bar or maybe up to 700bar [of pressure] then you need a compressor and this would be a low energy way of achieving this. That's the beauty about hydrogen, we're not going to have to bring it from half way around the world in a tanker, it can be generated on site for that particular application.

S1 Alex also needs high purity hydrogen at high pressure for the School's hydrogen lab to test the performance of new hydrogen storage materials.

S3 With a compressor we can generate incredibly pure hydrogen and we're using that currently throughout our research programmes. This project has not come to the end of the line. This project is going to continue on. This compressor is going to be used in the lab. We've had interest from a number of very large gas companies about using this technology and potentially developing it as an alternative to mechanical compression or compression using ionic liquids because it can deliver extremely pure hydrogen.

End of recording

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