New material could make gases more transportable

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Chemists at the University of Liverpool have developed a way of converting methane gas into a powder form in order to make it more transportable.

Scientists have developed a material made out of a mixture of silica and water which can soak up large quantities of methane molecules. The material looks and acts like a fine white powder which, if developed for industrial use, might be easily transported or used as a vehicle fuel.

Methane is the principal component of natural gas and can be burnt in oxygen to produce carbon dioxide and water. The abundance of the gas and its relatively clean burning process makes it a good source of fuel, but due to its gaseous state at room temperature, methane is difficult to transport from its source.

Professor Andy Cooper, Director of the Centre for Materials Discovery at the University's Department of Chemistry, explains: "Many natural gas reserves are geographically remote and can only be extracted via pipelines, so there is a need to look for other ways to transport the gas. It has been suggested that methane gas hydrate could be used as a way of containing methane gas for transportation. The disadvantage of methane gas hydrate for industry use is that it is formed at a very slow rate when methane reacts with water under pressure.

"To counteract these difficulties we used a method to break water up into tiny droplets to increase the surface area in contact with the gas. We

did this by mixing water with a special form of silica – a similar material to sand – which stops the water droplets from coalescing. This 'dry water' powder soaks up large quantities of methane quite rapidly at around water's normal freezing point."

The team also found that 'dry water' could be more economical than other potential products because it is made from cheap raw materials. The material may also have industrial applications if methane could be stored more conveniently and used to power clean vehicles.

Chemists at Liverpool are now investigating ways to store larger quantities of methane gas at higher temperatures and lower pressures as part of a project funded by the UK Engineering and Physical Sciences Research Council (EPSRC).

Source: University of Liverpool