

Natural deposits of helium gas could help aid the safe production of shale or coal gas, research suggests

September 29 2017

Natural deposits of helium gas – best known for its use in party balloons – could help aid the safe production of shale or coal gas, research suggests.

The discovery of high levels of helium in UK [coal](#) seams could help scientists to monitor the secure recovery of coal or [shale gas](#) from underground sites. Any gas leaks from deep underground would be accompanied by a rise in helium levels, which could be easily detected.

Their discovery could aid secure fracking – in which rocks below ground are split with high-pressure fluids – or extraction of [methane](#) gas from deep coal beds.

Scientists say their findings could be used alongside a chemical test to monitor whether methane at gas extraction sites has escaped from deep shale.

Together, the methods could help address public concerns over perceived contamination risks associated with the technologies.

In addition, scientists say their discovery may enable large volumes of helium gas to be recovered for sale. This valuable commodity is used in medical scanners and large-scale experiments such as the Large Hadron Collider at CERN.

Scientists at the University of Edinburgh and the Scottish Universities Environmental Research Centre sampled deep methane gas from an exploratory [coal bed methane](#) field in central Scotland and disused coal mines in central England. They found high levels of [helium gas](#) at each site.

They analysed the methane samples to identify tiny traces of inactive natural gases and different forms of carbon and hydrogen. These vary depending on the depth and origin of [methane gas](#), enabling scientists to fingerprint and distinguish each source of methane.

If, following industrial exploration, methane or helium levels in groundwater at extraction sites are found to have changed, analysis could determine whether the gas is natural or a leak from deep shale.

Their research, published in *Chemical Geology*, was supported by the Natural Environment Research Council, the Scottish Government, the University of Edinburgh and SUERC.

Professor Fin Stuart, from Scottish Universities Environmental Research Centre in East Kilbride, said: "The presence of such high amounts of helium in the natural gases intrigues us. It implies that the natural gas itself is ancient, and leads to the conclusion that the Scottish coals may not have lost much of the natural gas produced since it was deposited in Carboniferous times.

"Exploiting this high helium content to trace the leakage of deep gases into shallow groundwaters will lead us on a new journey to perfect ways of measuring small amounts of helium in natural water in real-time."

Dr Stuart Gilfillan, of the University of Edinburgh's School of GeoSciences, who led the project, said: "Measuring the high helium levels in these deep sourced UK coal gases will enable shale gas

exploration and extraction to be carried out responsibly, and help to address public concerns over this activity.

"Providing that helium levels in groundwaters are found to be low prior to exploration taking place, any presence of deep gas following shale gas activities will increase [helium](#) levels and allow robust detection of any contamination."

More information: Domokos Györe et al. Fingerprinting coal-derived gases from the UK, *Chemical Geology* (2017). [DOI: 10.1016/j.chemgeo.2017.09.016](#)

Provided by University of Glasgow

Citation: Natural deposits of helium gas could help aid the safe production of shale or coal gas, research suggests (2017, September 29) retrieved 20 May 2024 from <https://phys.org/news/2017-09-natural-deposits-helium-gas-aid.html>

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