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Investigating the Effects of Hydrogen on Wet Cement for Underground Hydrogen Storage Applications in Oil and Gas Wells

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Abstract : Green hydrogen is quickly emerging as a new source of renewable energy for the world. Hydrogen production using water electrolysis is deemed as an environmentally friendly and safe source of energy for transportation and other industries. However, storing a high volume of hydrogen seems to be a significant challenge. Abandoned hydrocarbon reservoirs are considered as viable hydrogen storage options because of the availability of the required infrastructure such as wells and surface facilities. However, long-term wellbore integrity in these wells could be a serious challenge. Hydrogen reduces the compressive strength of a set cement if it gets in contact with the cement slurry. Also, mixing hydrogen with cement slurry slightly increases its density and rheological properties, which need to be considered to have a successful primary cementing operation.

Keywords : hydrogen, well bore integrity, clean energy, cementing
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