

On Generating a Geological Model for Hydrogen Gas in the Southern Taoudenni Megabasin (Bourakebougou area, Mali)

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Abstract

A natural subsurface occurrence of pure hydrogen gas has been discovered in Mali. This discovery is being studied using conventional methods in order to produce a working geological model with predictive potential for finding more hydrogen gas in the same basin and elsewhere in the world.

An occurrence of 98% pure hydrogen gas has been discovered north of Bamako in a water well drilling surprise. A reported proven volume of hydrogen makes the discovery seemingly important locally and perhaps might even be of global significance. From the villagers in the mud huts of Bourakebougou to the green energy geo-visionaries around the world, the question becomes: “What does this H₂ gas discovery mean?” And more specifically for geoscientists: “What should we know in order to generate a geological model of the hydrogen occurrence in the rocks of Bourakebougou”? The objective of this paper is to explore this hydrogen discovery using conventional geological methods. Extensive surveys and technical reports were made to produce a preliminary geological model. We assume that using petroleum system logic, with some modifications, is as good a starting point as any. If so, then our exploration should concentrate on three essential issues:

1. Source of hydrogen,
2. Path of migration,
3. Reservoir and seal.

None of these issues have been solved definitely and work is progressing rather slowly mainly because of the tense political situation in Mali.

Our preliminary geological model is in a very early stage. We hope that our model might provide a predictive tool for discovering more hydrogen gas in the basin and elsewhere, but it is clear that all three issues need resolution.

Seemingly, the most important difference between hydrogen and hydrocarbons in rocks has to do with preservation potential, which is much lower for hydrogen. For this reason, a sustainable source of hydrogen is preferred over other sources under consideration.