Evaluating Metallic Material Performance in High-pressure Hydrogen Gas

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Evaluating Metallic Material Performance in High-pressure Hydrogen Gas

1 Scope

1.1 General

Understanding the fracture behavior of metallic materials in high-pressure H_2 environments can be useful for selection of materials in underground H_2 storage. Currently, there are sparse data on fracture mechanics of metallic materials typically used in oil and gas well construction when subject to high-pressure H_2 gas environments. This test program is an effort to generate data to provide some insight into testing procedures and material behavior, which over time could help the industry in evaluation and selection of materials in such service.

2 Normative References

There are no normative references in the document.

3 Acronyms, Abbreviations, and Symbols

σ	stress
K_{th}	threshold stress intensity factor
CMOD	crack mouth opening displacement
COD	crack opening displacement
C(T)	compact tension
DCPD	direct current potential drop
EDM	electrical discharge machining
El	elongation
FCGR	fatigue crack growth rate
FT	fracture toughness
H_2	hydrogen
H_2O	water
H_2S	hydrogen sulfide