Speaker 10

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Influence of iron oxide corrosion on hydrogen uptake and susceptibility to embrittlement in pipeline steels

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ABSTRACT:
Hydrogen is pivotal to achieving net-zero energy goals, with strategies focusing on repurposing natural gas networks for hydrogen transport. However, hydrogen embrittlement (HE) impacts the mechanical integrity of pipeline steels, creating significant uncertainties about their performance in service conditions and challenging the transition to hydrogen as an energy carrier.

This study investigates how surface conditions and microstructural variations in vintage pipeline steels, typical of national gas transmission networks, influence hydrogen uptake and HE susceptibility. Novel technologies to mitigate HE are also introduced, offering pathways to enhance pipeline resilience and safety.

By addressing critical challenges and advancing practical solutions, this work supports the integration of hydrogen into existing infrastructure. The findings contribute to robust strategies for mitigating HE in aging pipelines, aligning with energy transition goals and enabling the development of a sustainable hydrogen economy.