

Advancements in Hydraulic Fracturing for Unconventional Resources

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Abstract : Hydraulic fracturing has revolutionized the extraction of unconventional oil and gas resources, significantly increasing global energy reserves. This paper explores recent advancements in hydraulic fracturing technologies, focusing on the integration of real-time monitoring systems, environmentally friendly fracturing fluids, and nanotechnology applications. Case studies demonstrate how innovative approaches have enhanced resource recovery while minimizing environmental impact and operational costs. Additionally, the paper addresses challenges such as induced seismicity and regulatory constraints, proposing solutions to ensure sustainable development. These advancements promise to make hydraulic fracturing more efficient, sustainable, and adaptable to the evolving energy landscape.

Keywords : oil, gas, fracture, hydraulic

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