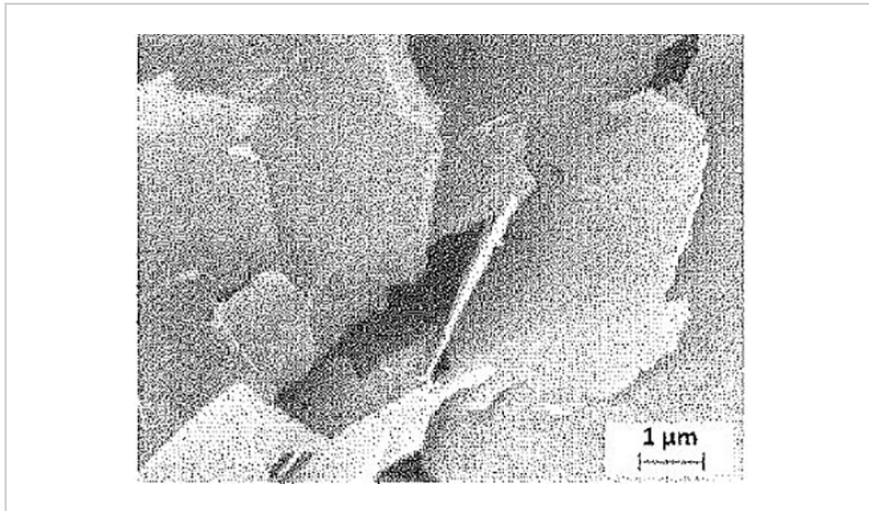


Using Graphite Nano-Platelets to Improve Integrity of Oil & Gas Wells

ID# 2018-4760



TEM Image of Graphite Nanoplatelet

Technology Summary

Cementing the casing in oil and gas wells often fails due to low tensile strength and toughness resistance of the cement sheath. To enhance the mechanical and durability characteristics of cement sheaths, low-cost graphite nanoplatelet (GnP) has been employed as a nano-scale reinforcement. GnP offers the physical properties of carbon nanotubes at a reduced cost. GnPs were experimentally shown to significantly control the crack propagation and improve the mechanical attributes of zonal isolation. The planar geometry of GnPs allows them to effectively improve the durability characteristics of cementitious paste.

Application & Market Utility

This novel formula creates a material that has four times the water resistance as regular concrete. This will increase the longevity of the material and make it more suitable for known flood zones. The formula is more elastic than standard concrete making it suitable for earthquake prone regions as well. With its greater strength, less concrete will be needed overall for projects. This is significant since making cement for concrete accounts for five percent of the greenhouse gas, carbon dioxide.

Next Steps

Patent pending. More experiments are planned to test conditions similar to bottomhole conditions. Seeking licensing and/or collaboration partners.

TECHNOLOGY READINESS LEVEL

1-3

Seeking

Licensing | Research

Keywords

- Cement casing
- Well integrity
- Microannulus
- Gas migration

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