



Energy - Fuel Research; Data on Fuel Research Reported by Researchers at University of Texas Austin (Deep Learning Enhanced Analyses for Pore Type-based Pore Characteristics In Shales Using High-resolution Large-area Sem)

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English

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2026 JUL 10 (VerticalNews) -- By a News Reporter-Staff News Editor at Energy Weekly News -- Current study results on Energy - Fuel Research have been published. According to news reporting out of Austin, Texas, by VerticalNews editors, research stated, "This study applies a deep learning-based workflow to enhance pore segmentation and classification in high-resolution, large-area scanning electron microscopy (SEM) images of shale samples from the Delaware Basin and Eagle Ford Group. To overcome limitations of traditional SEM workflows-such as small field-of-view and qualitative analysis-we utilize image areas exceeding the representative elementary area (250-1000 μm in length) to enable statistically robust quantitative analysis."

Financial supporters for this research include Project STARR (State of Texas Advanced Oil and Gas Resource Recovery), Mudrock Systems Research Laboratory (MSRL) at the **Bureau of Economic Geology**, University of Texas at Austin, MSRL.

Our news journalists obtained a quote from the research from the University of Texas Austin, "An iterative U-Net segmentation model, refined through local correction, achieves high accuracy across five shale samples, effectively addressing challenges including overlapping grayscale intensities, milling artifacts, and charging effects. A stepwise classification algorithm further categorizes pores into organic matter-lined (OML), clean mineral (CM), and intraparticle (Intra) types. Quantitative analyses of pore size distribution and porosity by pore type provide critical insights on the contributions from different types of pores that are relevant to oil and water saturation and flow, critical insights not accessible through conventional techniques such as mercury intrusion capillary pressure (MICP) or nuclear magnetic resonance (NMR). The pore size distribution derived from image analysis shows good agreement with MICP-derived pore throat sizes, while porosity estimates are compared against helium pycnometry measurements. The causes and implications of observed similarities and discrepancies are discussed, including the influence of sub-resolution pores and sample heterogeneity."

According to the news editors, the research concluded: "This innovative workflow establishes a scalable, image-based methodology for pore-scale reservoir characterization, offering a powerful tool for advancing quantitative shale reservoir evaluation and improving predictions of oil and water production."

This research has been peer-reviewed.

For more information on this research see: Deep Learning Enhanced Analyses for Pore Type-based Pore Characteristics In Shales Using High-resolution Large-area Sem. Fuel, 2026;415. Fuel can be contacted at: Elsevier Sci Ltd, 125 London Wall, London, England. (Elsevier - www.elsevier.com; Fuel - www.journals.elsevier.com/fuel/)

Our news journalists report that additional information may be obtained by contacting Sheng Peng, University of Texas Austin, Jackson School of Geosciences, Bur Econ Geol, Univ Stn Box 10, Austin, TX 78713, United States.

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