Pore Characterization and Geologic Controls on Matrix Permeability of the Eagle Ford Shale

Tobi Kosanke

ALS Oil and Gas, 6510 Guhn Rd., Houston, Texas 77040

GCAGS Explore & Discover Article #00073*
http://www.gcags.org/exploreanddiscover/2016/00073_kosanke.pdf
Posted September 13, 2016.

*Article based on an extended abstract published in the *GCAGS Transactions* (see footnote reference below), which is available as part of the entire 2016 *GCAGS Transactions* volume via the GCAGS Bookstore at the Bureau of Economic Geology (www.beg.utexas.edu) or as an individual document via AAPG Datapages, Inc. (www.datapages.com), and delivered as an oral presentation at the 66th Annual GCAGS Convention and 63rd Annual GCSSEPM Meeting in Corpus Christi, Texas, September 18–20, 2016.

EXTENDED ABSTRACT

The Eagle Ford consists almost entirely of interbedded marl and limestone. The permeability of tight rocks measured on crushed core material cannot take into account this laminated textures of the marls, which is destroyed in the crushing process. Rosen et al. (2014) described a dual-pump system that can measure permeabilities below 1 nD using low viscosity, low compressibility supercritical CO_2, which is miscible with residual core liquids. This dual-pump system utilizes an injection pump operating at constant rate with a back pump maintaining constant pressure. This system was used to measure permeability on 36 plugs from the Eagle Ford representing a range of textures, compositions and facies. The TOC (total organic carbon) content of these samples varied between 2 and 12%, the porosity ranged from 8 to 12% and the thermal maturity ranged from a vitrinite reflectance (Ro) of 0.62 to 1.45.

The permeability of the marls in the Eagle Ford was found to be on the order of 1 to 10 nD, with permeability increasing with increasing calcite content. Permeability increased with the degree of lamination, with finely laminated marls being more permeable than marls without any lamination. The limestones were found to be more permeable than the marls, likely due to the presence of microfractures, which were likely closed in the subsurface and reopened by the coring process, but suggest that when stimulated, would have higher permeability in the subsurface than the non-laminated marls.

…

Originally published as: Kosanke, T., 2016, Pore characterization and geologic controls on matrix permeability of the Eagle Ford Shale: Gulf Coast Association of Geological Societies Transactions, v. 66, p. 807–808.