
Origin and Characterization of the Lithofacies and Dual Micropore/ Macropore Network in Pennsylvanian (Early Desmoinesian) Caddo Shelf-Buildup Complexes, Stephens County, North-Central Texas

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ABSTRACT

The Pennsylvanian (early Desmoinesian) Caddo Formation in north-central Texas contains shelf carbonate buildups composed of phylloid algal and *Komia* allochems with early cementation and microbial binding. Cores from the Caddo reservoirs have a dual pore network composed of macro- and micropores. The macropores are original interparticle and intraparticle pores, as well as moldic and vuggy pores associated with the dissolution of aragonite allochems. The micropores are produced by the transformation of Mg–calcite allochems, micrite rims, and peloidal muds to calcite. Porosity ranges between 0.8% and 25.1%, and permeability ranges between 0.01 md and 370.5 md. The phylloid algal facies and *Komia* facies have the best reservoir quality. The presence of micropores must be considered when analyzing porosity-permeability transforms, hydrocarbon saturation, and reservoir reserves.