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## **PS Microbial Carbonates as Hydrocarbon Reservoirs\***

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Search and Discovery Article #30106 (2009)

Posted November 30, 2009

\*Adapted from poster presentation at AAPG Convention, Denver, Colorado, June 7-10, 2009

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### **Abstract**

Microbial carbonates occur in rocks of Precambrian to Recent age in virtually any depositional environment. Microbial reservoir rocks fall into 3 main structural categories: 1) stromatolites, 2) thrombolites, and 3) leiolites; the first two being most common. If preserved, microfabrics within microbialites can help to subdivide macrostructural forms and pinpoint environmentally-related depositional fabrics. Reservoirs in microbialites must be large enough to contain commercial hydrocarbon accumulations, thus eliminating buildups smaller than hundreds of acres and several feet in thickness.

Porosity and permeability in microbialites may be depositional, diagenetic, or fractured. Jurassic examples in Alabama have diagenetically altered depositional and purely diagenetic porosity; Mississippian examples usually have altered separate-vuggy porosity with fracture-enhanced permeability. Depositional pores in stromatolites include interlaminar voids, constructed vugs, and fenestrae. Depositional pores in thrombolites include constructed vugs or sub-millimeter sized matrix pores with moderate to good inter-body connectivity. Micritic leiolites and mud-mounds do not typically exhibit effective depositional porosity, but diagenesis and fracturing can transform them into prolific producers.

Stromatolites, thrombolites, and leiolites/mud-mounds are more abundant in Paleozoic rocks than younger ones but recent discoveries in Cretaceous microbialites off Brazil reveal the global scale and economic importance of microbial carbonates. Developing these microbial reservoirs will require defining flow units and petrophysical rock types by their depositional macrostructures, internal microfabrics, poroperm-altering diagenesis or fractures, and the inter-relationships of those attributes with reservoir performance.

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