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COMPOSITE CONSTRUCTIONS WITH ORIENTED MICROSTRUCTURE5 **ABSTRACT OF THE DISCLOSURE**

In one embodiment, composite constructions of the invention are in the form of a plurality of coated fibers bundled together to produce a fibrous composite construction in the form of a rod. Each fiber has a core formed from a hard phase material, that is surrounded by a shell formed from a binder phase material. In another embodiment of the invention, monolithic sheets of the hard phase material and the binder phase material are stacked and arranged to produce a
10 swirled composite in the form of a rod. In still another embodiment of the invention, sheets formed from coated fibers are arranged to produce a swirled composite. Inserts for use in such drilling applications as roller cone rock bits and percussion hammer bits, and shear cutters for use in such drilling applications as drag bits, that are manufactured using conventional methods
15 from these composite constructions exhibit increased fracture toughness due to the continuous binder phase around the hard phase of the composites. These binder phases increase the overall fracture toughness of the composite by blunting or deflecting the tip of a propagating crack.

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