5. The rotor of claim 1, wherein the threads of the rotor cylinder and the sealing cap are U-shaped threads, or modified sharp-V threads.

6. The rotor of claim 5, wherein the modified sharp-V screw threads include a thread angle of about 60 degrees.

7. A magic angle sample spinning (MAS) nuclear magnetic resonance (NMR) rotor, comprising:

a rotor cylinder composed of a high mechanical strength ceramic with a first inner bore that defines an integrated sample compartment that spans the inner diameter of the rotor cylinder with threads disposed along the inner wall at the upper end of the sample compartment, and a second inner bore that defines an integrated compartment for mounting a spin tip disposed at an end of the rotor cylinder opposite the sample compartment; and

a threaded sealing cap with threads that match the threads of the rotor cylinder, the threaded sealing cap is comprised of a high mechanical strength ceramic and configured to secure and compress at least one high-temperature gasket that seals the sample compartment;

whereby the integrated sample compartment, at least one gasket and sealing cap when combined and secured maintain a pressure within the sample compartment of the rotor cylinder of at least up to about 200 atm and a temperature of at least up to about 300° C. without the use of a sealing adhesive.

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