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[54] **NMR MAS SEALING SAMPLE CELLS AND METHODS**

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[51] **Int. Cl.**⁷ **G01V 3/00**

[52] **U.S. Cl.** **324/321**

[58] **Field of Search** 324/320, 321, 324/322

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[57] ABSTRACT

A cylindrical NMR sample cell is made from a first plastic material having Young's modulus Y_1 , tensile strength S_1 , and density p_1 with precision outside diameter (OD) d_4 , wherein the outside diameter fits inside a ceramic NMR MAS rotor having modulus Y_3 and density p_3 . The sample cell comprising a sample chamber with a concentric cylindrical opening at one end having inside diameter d_2 . A cylindrical plug is made from a second plastic material having modulus Y_2 , strength S_2 , and density p_2 with plug outside diameter d_1 to fit firmly inside the mouth of the cell, so as to seal the sample of density p_4 inside the cell with inside cell diameter d_3 when stationary and to seal when spinning at a high rate of speed inside the ceramic rotor. More-over, the following materials properties and relationships are satisfied: $Y_1 > 0.8$ GPa, $Y_1 < 4$ GPa, $Y_2 < 3.4$ GPa, $S_1 > 8$ MPa, $S_2 > 3$ MPa, $p_2 > 880$ kg/m³, $p_2 > p_4$, $Y_3 > Y_2 > Y_1$, and $p_2/Y_2 > p_1/Y_1$. A dual-chamber cell is also disclosed to facilitate external lock.

24 Claims, 1 Drawing Sheet

