DATA REQUIRED FOR NEW PROPOSALS FOR NOMINATION

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Factual Biographical Material (not over 250 words)

In 1792, after Lavoisier discovered graphite and diamond to be carbon allotropes, men began to attempt to convert graphite to diamond. However, 172 years passed before this was accomplished. The first demonstrable conversion was achieved in 1954 by H. Tracy Hall, a member of a G. E. Research Group.[1]

Hall is the pioneer of simultaneous high-pressure, high-temperature research, having developed the first devices capable of sustaining 100,000 atmospheres at 2000° C.[2,3] Such equipment was necessary for the diamond synthesis.

On leaving G. E. in 1955, company secrecy plus government secrecy orders prevented Hall from using his "Belt" apparatus for further research. To circumvent this problem, Hall invented a second device, the "Tetrahedral Press." Details of this high pressure-temperature apparatus were published in 1958 and caused hundreds of scientists to visit his laboratory to see the equipment and learn of his methods. From these beginnings, several hundred high pressure-temperature facilities have been established around the world, and published articles in the field have increased from one or two to about 600 per year.

In the new pressure-temperature regime, Hall made the first melting point measurements,[4] and, with his associates, the first x-ray diffraction measurements,[5,6,7] discovered the first pressure-induced fcc to bcc structure transition[8], and solved the twelve-year-old problem concerning the pressure-resistance cusp in cesium.[9]

Other important research by Hall includes apparatus improvement,[10] the pressure scale,[11] and periodic compounds.[12]

Following a recent Council ruling, a list of not more than 12 selected bibliographical references to the nominee's work should be appended for the printed biographical sketch.

Selected Bibliographic References of H. Tracy Hall

September 1968

1. H. Tracy Hall, "The Synthesis of Diamond," J. Chem. Educ., 38, 484-489 (1961). Note: Publication of these details was delayed approximately six years by secrecy orders.

2. H. Tracy Hall, "Ultrahigh Pressure, High Temperature Apparatus: The Belt," Rev. Sci. Instr. 31, 125-131 (1960). Note: Publication delayed approximately seven years by secrecy orders.

3. H. Tracy Hall, "Some High Pressure, High Temperature Apparatus Design Considerations: Equipment for Use at 100,000 Atmospheres and 3000°C," Rev. Sci. Instr. 29, 267-275 (1958) (The Tetrahedral Press).

4. H. Tracy Hall, "The Melting Point of Germanium as a Function of Pressure to 180,000 Atmospheres," J. Phys. Chem., 59, 1144-1146 (1955).

5. J. Dean Barnett, Roy B. Bennion, H. Tracy Hall, "High Pressure X-ray Diffraction Studies on Barium," Science, 141, 534-535 (1963).

6. J. Dean Barnett, Roy B. Bennion, H. Tracy Hall, "X-ray Diffraction Studies on Tin at High Pressure and High Temperature," Science, 141, pp. 1041-2 (1963).

7. J. Dean Barnett and H. Tracy Hall, "High Pressure-High Temperature X-ray Diffraction Apparatus," Rev. Sci. Instr., 35, 175-182 (1964).

8. H. Tracy Hall, J. Dean Barnett, and Leo Merrill, "Ytterbium: Transition at High Pressure from Face-Centered Cubic to Body-Centered Cubic Structure," Science 139, 111-112 (1963).

9. H. T. Hall, L. Merrill and J. D. Barnett, "High Pressure Polymorphism in Cesium," Science, 146, 1297-1299 (1964).

10. H. T. Hall, High Pressure Apparatus: Ram-In-Tie-Bar Multianvil Presses," Rev. Phys. Chem. Japan 37, 63-71 (1967).

11. R. N. Jeffery, J. D. Barnett, H. Vanfleet, H. T. Hall, "A Pressure Scale to 100 Kilobar Based on Compression of Sodium Chloride," Journal of Applied Physics., 37, 3172-3180 (1966).

12. H. T. Hall, "Periodic Compounds: Syntheses at High Pressures and Temperatures," Science, 148, 1331-3 (1965).