THE FTMW SPECTRUM OF CORANNULENE

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For the first time in the laboratory, we have observed the rotational microwave spectrum of gas-phase corannulene ($C_{20}H_{10}$). The structure of corannulene was determined by Hedberg et al. (J.Phys.Chem.A, 104, 7689 (2000)) and comprises one-third of the fullerene molecule C_{60}, the so-called bucky ball, with hydrogen atoms terminating the peripheral carbon framework, which shows C_{5v} symmetry. Essentially, corannulene is comprised of a central pentagon surrounded by five hexagon rings with carbon atoms at each apex and 10 hydrogen atoms are attached to the outer pairs of carbon atoms in the hexagons. The introduction of the pentagon causes a tesselation of hexagons to warp and the whole molecule is puckered in the shape of a scull cap, a so-called bucky bowl. For closed fullerenes and most flat polycyclic aromatic hydrocarbons (PAHs), the dipole moment is zero by symmetry, but for a cap, the permanent dipole moment can be substantial (Theor. Chem. Acc. 97, 67(1997)). The initial studies of the rotational spectrum were carried out at NIST and further measurements, including Stark effect measurements, were accomplished at the University of Hannover. Details of the measurements and analysis will be presented.