Professor Sir Harold Walter KROTO

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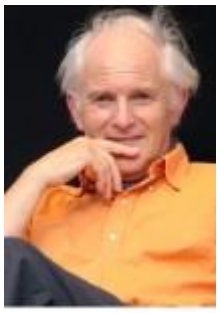

He shared (with Robert F. Curl Jr. and Richard E. Smalley)

the 1996 Nobel Prize in Chemistry

for the discovery of C60 Buckminsterfullerene

a new form of carbon

Main research areas:

I. Spectroscopy of Unstable Species and Reaction Intermediates (Infrared, Photoelectron, Microwave and Mass Spectrometry)
II. Astrophysics (Interstellar Molecules and Circumstellar Dust)
III. Cluster Science (Carbon and Metal Clusters, Microparticles, Nanofibres)
IV. Fullerene Chemistry, Nanoscience and Nanotechnology

Research Highlights

1. First detection of $^1\Delta$ state of a polyatomic free radical (NCN by flash photolysis) [3, 4]
2. Theoretical studies of ground and electronically excited sates of small molecules [5, 6]
3. Detection of liquid phase intermolecular interactions using Raman Spectroscopy [7-10]
4. Breakthrough in the detection of new unstable species (thioaldehydes, thiocarbonyls thioborines) using combination of microwave and photoelectron spectroscopy techniques [12, 15, 18-22, 31, 80]
5. Synthesis in 1976 of the first phoaphaalkenes (compounds containing the free carbon phosphorus double bond) in particular CH2=PH (with N P C Simmons and J F Nixon, Sussex), [28, 80]
6. Monograph "Molecular Rotation Spectra" [23]
7. Synthesis in 1976 of the first analogues of HCP, the phosphaalkynes which contain the carbon phoshorus triple bond – in particular CH3CP (with N P C Simmons and J F Nixon, Sussex), [29, 80]

8. The discovery (1976-8) of the cyanopolyynes, HCnN (n = 5, 7, 9), in interstellar space (with D R M Walton A J Alexander and C Kirby (Sussex) and T Oka, L W Avery, N W Broten and J M MacLeod (NRC Ottawa)), Ref 4-6, based on microwave measurements made at Sussex, [27, 30, 35, 80]
9. The discovery of C60: Buckminsterfullerene in 1985 (with J R Heath, S C O'Brien, R F Curl and R E Smalley), [100, 112, 139, 239]
10. The detection of endohedral metallofullerene complexes (with J R Heath, S C O'Brien, Q Zhang, Y Liu, R F Curl, F K Tittel and R E Smalley), [101, 139]
11. The prediction that C60 should be produced in combustion processes and might indicate how soot is formed (with Q L Zhang, S C O'Brien, J R Heath, Y Liu, R F Curl and R E Smalley) [103,139]
12. The explanation of why C70 is the second stable fullerene (after C60) and the discovery of the Pentagon Isolation Rule as a criterion for fullerene stability in general [107, 112, 139, 239]
13. The prediction of the tetrahedral structure of C28 and the possible stability of "tetravalent" derivatives such as C28H4 [107, 112, 139, 239]
14. The prediction that giant fullerenes have quasi-icosahedral shapes and the detailed structure of concentric shell graphite microparticles (with K G McKay), [111, 112, 139, 239]
15. The mass spectrometric identification and solvent extraction (with J P Hare and A Abdul-Sada) of C60 from arc processed carbon in 1990 – independently from and simultaneously with the Heidelberg/Tucson group; Refs [121, 239]
16. The chromatographic separation/purification of C60 and C70 and 13C NMR measurements which provided unequivocal proof that these species had fullerene cage structures (with J P Hare and R Taylor, Sussex), Refs [121, 139, 239]
17. Crystal structure of C60 [135, 138]
18. Main Fullerene chemistry breakthroughs: C60(ferrocene)2 [162], characterisation of C60Hal6 [174, 149], C60(P4)2 [187, 192]
19. Nanoscience and Nanotechnology advances: Condensed phase nanotubes [205], nanoscale BN structures [224], partly aligned-nanotube bundles [233], nanotube formation mechanisms [161, 238], silicon oxide nanostructures [247], Si surface-deposited fullererene studies [251], insulated carbon nanotube conductors [297]

Overview

Fellow of the Royal Society (1990),
Foreign Associate of the National Academy of Sciences (US),
President of the Royal Society of Chemistry (2002-2004).
Longstaff Medal of the Royal Society of Chemistry (1993),
Faraday Lecturer 2001 (Royal Society),
Copley Medal of the Royal Society (2002),
Erasmus Medal of Academia Europaea,
Freeman of the City of Torino,
29 Hon Degrees.

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18. H W Kroto and R J Suffolk, 'The photoelectron spectrum of F_2CS and fluorine substitution shifts', Chem. Phys. Letts., 17, 213-216 (1972).
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