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New Insights to the Structure of PPTA (Kevlar) from Neutron Fibre Diffraction Using Selective Deuteration. V.T. Forsyth^{1,2}, K. H. Gardner³, A.D. English^{3,4} ¹Inst. Laue Langevin, 38042 Grenoble Cedex 9, France ; ²Lennard Jones Laboratories, School of Chemistry & Physics, Keele Univ., Staffordshire ST5 5BG; ³DuPont Central Research and Development, Experimental Station, Wilmington DE 19880, USA; ⁴Dept. of Materials Science & Engineering, Univ. of Delaware, Newark, DE 19716, USA.

Structural studies of poly(*p*-phenylene terephthalamide) (PPTA) fibers using neutron diffraction techniques will be described. These studies exploit the use of fibers in which the terephthaloyl moieties of the polymer have been selectively deuterated. The neutron fiber diffraction data show conclusively that the terephthaloyl moieties (as are the diamine moieties) are positioned at the same height, along the *c* axis in the crystal unit cell, as the terephthaloyl moieties in adjacent sheets. This preliminary study clarifies long-standing questions concerning the crystal structure of PPTA and illustrates the unique role that neutron diffraction studies can play in polymer structure determination.