PYROLYTIC GRAPHITE AS AN EFFICIENT SECOND-ORDER NEUTRON FILTER AT TUNED POSITIONS OF BOUNDARY CROSSING

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An investigation of pyrolytic graphite (PG) crystal as an efficient second order neutron filter at tuned boundary crossings has been carried out. The neutron transmission through PG crystal at these tuned crossing points as a function of first- and second-order wavelengths were calculated in terms of PG mosaic spread and thickness. The filtering features of PG crystals at these tuned boundary crossings were deduced. It was shown that, there are a large number of tuned positions at double and triple boundary crossings of the curves (hkl) are very promising as tuned filter positions. However, only fourteen of them are found to be most promising ones. These tuned positions are found to be within the neutron wavelengths from 0.133 up to 0.4050 nm. A computer package GRAPHITE has been used in order to provide the required calculations in the whole neutron wavelength range in terms of PG mosaic spread and its orientation with respect to incident neutron beam direction. It was shown that 0.5 cm thick PG crystal with angular mosaic spread of 2^{o} is sufficient to remove 2^{nd}-order neutrons at the wavelengths corresponding to the positions of the intersection boundaries curves (*hkl*).

Keywords: pyrolytic graphite, neutron filter, 2^{nd}-order neutrons, mosaic spread.