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Exposures of nuclear track emulsion to light radioactive nuclei, neutrons, and heavy ions

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Nuclear track emulsion (NTE) stays to be a versatile and inexpensive technique for forefront researches. In JINR samples of reproduced NTE have been exposed to 1.2 A GeV 11C nuclei, 7 A 8He nuclei, thermal and fast neutrons and 1.2 A MeV Kr and Xe ions. NTE has retained its position as a means for studying a nuclear clustering via relativistic fragmentation [1]. Using the ACCULINNA separator 8He nuclei were implanted into NTE which allowed to observe a drift of 8He atoms and to derive the distribution over decay energy $Q2\alpha$. The established "tail" of large values $Q2\alpha$ could allow one to examine a structure of the state 8Be2+. Correlations of α-particles 12C $\rightarrow$ 3α are studied in NTE exposed to 14.1 MeV neutrons of the apparatus DVIN. Energy distributions $Q2\alpha$ and $Q2\alpha$ indicate on superposition of the 8Be 0+ and 2+ states in the 12C ground state at that 8Be2+ is dominating. NTE enriched with boron is exposed to thermal neutrons at the reactor IBR-2 allow one to extend range calibration for the 7Li nucleus using events nth + 10B $\rightarrow$ 7Li + (γ) + α. Angular and energy correlations of the reaction products are studied. There is a prospect of an NTE application in physics of a ternary fission. It is necessary to perform range calibrations and to estimate of angular resolution for an available variety of heavy ions..

[1] P.I. Zarubin, Lect. Notes in Phys. 875, 51 (2013); arXiv:1309.4881.

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