The foregoing data indicate that inclusions play an important role in the mechanism of laser damage of ruby crystals. The decisive mechanism of damage of real crystals is apparently connected with the presence of absorbing inclusions. It must be emphasized that the problem of inclusions is more serious in crystals than in glasses, in view of the low solubility of many impurities in crystals and in view of the presence in the latter of structure defects that facilitate the formation of foreign-phase inclusions.

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ANGULAR DISTRIBUTION OF PROTONS IN THE REACTION $Li^6(e, e'p)He^5$ AT ELECTRON ENERGY 1158 MEV

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Submitted 10 August 1972
ZhETF Pis. Red. 16, No. 6, 339 - 341 (20 September 1972)

We measured the angular distribution of protons knocked-out by 1158-MeV electrons from the 1p and 1s shells of the Li^6 nucleus. We have compared the experimental data with shell-model calculations with an oscillator potential.

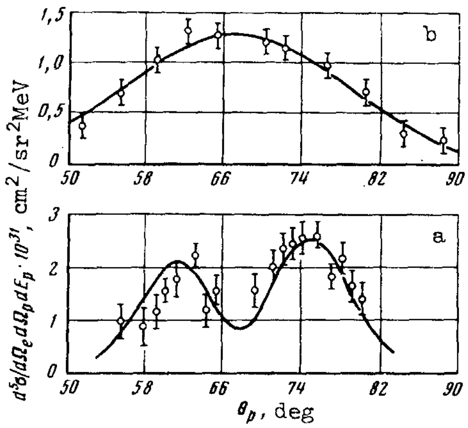
We have previously measured the cross section of the reaction $Li^6(e, e'p)He^5$ as a function of the missing energy $B = k_0 - k_1 - T_p - T_N$, where k_0, k_1, T_p, and T_N are the energies of the initial and final electrons and the kinetic energies of the proton and of the residual nucleus, respectively. The cross section has two well-separated peaks at B = 3.5 ± 1 MeV and B = 19 ± 1 MeV, corresponding to the production of the He^5 nucleus in the ground state with excitation energy 16.7 MeV.

We present here the results of a measurement of the angular distribution of the protons in the $Li^6(e, e'p)He^5$ reaction at the two aforementioned values of the missing energy B.

The measurements were performed with an electron beam of energy 1158 ± 3 MeV from the linear accelerator of the Physico-technical Institute of the Ukrainian Academy of Sciences at a constant angle of registration of the secondary electrons (20° in the lab) and at a constant proton momentum (396 MeV/c). The energy of the secondary electrons was adjusted to make the missing energy equal to 4 and 20 MeV. The secondary electrons and protons were momentum-analyzed with two magnetic spectrometers [1] with solid angles 1.3×10^{-3} and 2.4×10^{-3} sr, respectively.

To register the electrons we used a three-channel telescope with a momentum coverage 0.4% per channel and with a distance 0.6% between neighboring channels; the protons were registered with a telescope with a momentum coverage 3.12%. The coincidences of the signals of each of the three channels of the electron telescope with the signal from the proton telescope, as functions of the proton emission angle θ_p, were registered with time-amplitude converters.

In the momentum plane-wave approximation, the cross section of the (e, e'p) reaction is proportional to the cross section for the scattering of an electron by a proton moving with momentum $\vec{q}$, and to the square of the wave function of this proton in the target nucleus [2, 3]. Since the momentum $\vec{q}$ is determined uniquely from the kinematics of the reaction, measurement of the angular correlation makes it possible to determine the momentum distribution of the protons inside the nucleus.



Angular distributions of the protons in the reaction Li^6 (e, e'p)He^5 at B = 4 MeV (a) and B = 20 MeV (b).

The measured angular distribution protons for B = 4 MeV and B = 20 MeV are shown in Figs. a and b, where the cross sections are given with allowance for the radiative corrections (17%) [4]. A comparison of the experimental data with the results of shell-model calculations with an oscillator potential show that the angular distributions for B = 4 MeV and B = 20 MeV correspond to protons knocked out of the 1p and 1s shells of the Li^6 nucleus. The solid lines in the figure show the results of a χ^2-fit of the angular distributions for different values of the parameter of the momentum distribution for the 1p and 1s shells of the Li^6 nucleus, using a computer and the Monte Carlo method with allowance for the energies and angles covered by the measuring apparatus. The momentum-distribution parameters determined by the minimum χ^2 are q_p = 49.8 ± 5.0 MeV/c (χ^2 = 25 for 16 degrees of freedom) and q_s = 108 ± 9 MeV/c (χ^2 = 5 for nine degrees of freedom.

The value of the parameter q_p measured by us for 1p shells differs noticeably from that obtained in the Li^6(p, 2p)He^5 reaction [5]. For the 1s shell, our results agree well with the data of [5].

The authors are grateful to Professor A.P. Klyucharev for constant interest in the work and to Professor E.V. Inopin for useful consultations.

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INFLUENCE OF CONSTANT MAGNETIC FIELD ON THE MAGNITUDE OF THE MAGNETOPLASTIC EFFECT

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Submitted 10 August 1972
ZhETF Pis. Red. 16, No. 6, 341 - 344 (20 September 1972)

It was shown in [1, 2] that during the course of plastic-deformation an alternating magnetic field causes weakening of nickel single crystals. This phenomenon, called the magnetoplastic effect, was attributed to the interaction between the magnetic domain walls and the dislocations.

Experiments aimed at detecting the magnetoplastic effect in polycrystalline nickel upon application of a magnetic field [2] have confirmed the