Contribution ID: **93** Type: **Poster**

Optimization of the 6He production target in the 7Li(γ, p)6He reaction

Tuesday, 9 June 2015 18:30 (1h 30m)

The facility for the exotic 6He nuclei production in the 7Li(γ, p)6He reaction was built in the Flerov Laboratory of Nuclear Reactions in Dubna. As the target material the fine salt of Li2CO3 and LiF were used. The ECR ion source was included in the facility to ionize the 6He atoms and produce the heavy ion beam. The measured value of the 6He at the entrance of the ECR source was (1,7±0,2) 107 atoms/s per1 μA of electron beam current. The ECR source efficiency of the 6He ionization was 8%, as the result - the value of the 6He ions was obtained at the level of (1.4±0.2)×106 ions/s per 1 μA of electron beam current. Series of dedicated tests were done to examine the diffusion and effusion effects on the helium transportation delay from the production target (Ø83 mm, 300 mm length)to the ECR source. It was found that the main 6He losses were occurred due to effusion processes. The estimation value of the diffusion losses were not more than 10%. The detailed overview of the facility and the features of diagnostic set-up used for 6He production parameters evaluation and control during tests are discussed. State of art and future plans are presented.

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Session Classification: Poster session

Track Classification: Production and manipulation of RIB