Evaluation of Mass Produced Nuclear Emulsion Plates

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The purpose of the E07 experiment at J-PARC is to understand Λ-Λ interaction by the detection of double-hypernuclei in nuclear emulsion plate about 10 times larger statistics than that in the E373 experiment at KEK-PS. To identify many double-hypernuclei in the E07 experiment, it is necessary to make a large amount of nuclear emulsion plates.

We optimized and established production method with many tests for massive plate making. Problem in the E373 experiment was appearance of silver on surface of emulsion plates after they were developed. We succeed to prevent that problem by the development of "surface coat" method as shown in Fig. 1, *i.e.* making gelatin skin with 0.5 μm thick on surface of the plates and confirmed that the sensitivity of α track is maintained as shown in Fig. 2. Besides, we used the amount of plasticizer to avoid cracking of the emulsion plates.

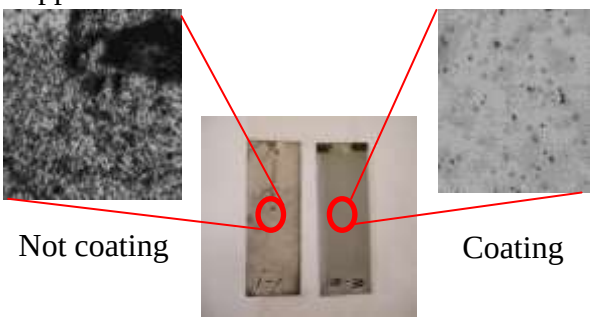

Fig. 1 Developed nuclear emulsions and surface of them.

Now, we have successfully finished nuclear emulsion plates making. We evaluated uniformity of their thickness, size and density. The thickness of thick poured emulsion plate is 997.5±5.7μm. The length of upper, lower, right-hand and left-hand side are 345.08 ± 0.05 mm, 345.23 ± 0.13 mm, 350.03 ± 0.04 mm and 350.80 ± 0.05 mm, respectively. The angle differences of opposite sides in horizontal and vertical line are 2.18 ± 0.05 mrad/m and 0.319 ±0.48 mrad/m. The density is 3.676 ± 0.032 g/cm^3. They seem to be uniform and enough for the request to the plates. We will test the sensitivity, development method and so on, soon.

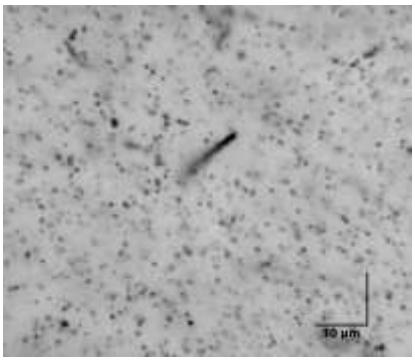

Fig.2 α track in nuclear emulsion

In this paper, we will introduce the evaluation data of production method for nuclear emulsion plates which will be used for the E07 experiment.