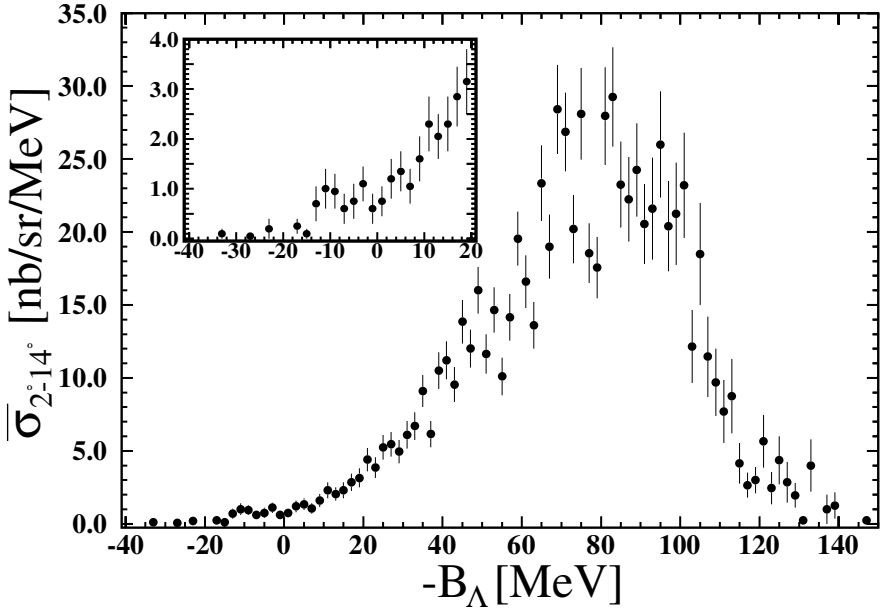

Figure 1: Missing-mass spectrum of the (π^-, K^+) reaction on a ^{10}B target at 1.2 GeV/c. The horizontal axis shows the binding energy of a Λ, whereas the vertical axis shows the cross section in terms of nb/sr/MeV. An expanded view near the Λ bound region is shown in the inset.

The study of neutron-rich Λ hypernuclei would provide new information on hypernuclear physics, such as a strong attractive mechanism due to coherent Λ-Σ coupling [1]. This coherent coupling becomes more effective as the excess neutron number of the nucleus becomes larger, and eventually affects the baryon interaction in high-density nuclear matter, like neutron stars. However, there have been few experimental efforts to produce neutron-rich Λ hypernuclei. In the present experiment, we used the in-flight (π^-, K^+) DCX reaction on a ^{10}B target in order to produce a $^{10}_{\Lambda}$Li hypernucleus for the first time.

The present experiment was carried out at the K6 beam line of KEK 12-GeV proton synchrotron (PS) together with the superconducting kaon spectrometer (SKS) system. Fig. 1 shows the missing-mass spectrum on ^{10}B at 1.2 GeV/c incident momentum. We obtained 47 counts in the bound region, whereas the QF events were 3064 counts. We estimate the background (b.g.) in the signal region, i.e. for -20 $\leq -B_\Lambda \leq$ 0 MeV, to be 0.9 nb/sr, by assuming a constant b.g., which was deduced from the events below $-B_\Lambda =$ -20 MeV. Then the $^{10}_{\Lambda}$Li signal is 11.3 $\pm$ 1.9 nb/sr. The tail from the quasi-free events does not contribute much to the yields because of a good energy resolution (2.5 MeV in FWHM). The experimental hypernuclear production cross sections are summarized in Table 1.

References

[1] Y. Akaishi *et al.*, Phys. Rev. Lett. **84**, 3539 (2000).

Reaction	Cross Section	
	1.05GeV/c	1.2GeV/c
$^{12}\mathrm{C}(\pi^+, K^+)^{12}_{\Lambda}\mathrm{C}$	18.0 ± 0.7 μb/sr	17.5 ± 0.6 μb/sr
$^{10}\mathrm{B}(\pi^+, K^+)^{10}_{\Lambda}\mathrm{B}$	7.8 ± 0.3 μb/sr	no data
$^{10}\mathrm{B}(\pi^-, K^+)^{10}_{\Lambda}\mathrm{Li}$	5.8 ± 2.2 nb/sr	11.3 ± 1.9 nb/sr

Table 1: Hypernuclear production cross sections for the bound region averaged over the scattering angle from 2 to 14 degree. The quoted errors are statistical.