**81Kr dating with 1 kg of polar ice**

Jie Wang1, Xin Feng1, Wei Jiang1, Qiao-Song Lin2, Zheng-Tian Lu1, Florian Ritterbusch1, Guo-Min Yang1

1University of Science and Technology of China, 96 Jinzhai Road, Hefei 230026, China.

2CAS Dalian Institute of Chemical Physics, 457 Zhongshan Road, Dalian 116023 China

E-mail address: wjiang1@ustc.edu.cn

**Abstract:**

81Kr is a cosmogenic isotope with half-life of 229 ka. Its dating range is 20-1500 ka, which covers many applications for polar ice. 81Kr can provide absolute, radiometric ages and do not rely on continuous stratigraphy. Thus it is complementary to conventional ice dating techniques and is particularly valuable for disturbed ice samples. 81Kr-dating on 200 kg blue ice samples from the Taylor Glacier has been demonstrated in 2014, using the Atom Trap Trace Analysis (ATTA) method. Over the past decade, there has been continuous efforts to reduce the sample size so that 81Kr-dating can be applied on deep ice cores, especially the stratigraphically disturbed ones. In this talk, I will present some of our works along this journey and report our recent technical breakthrough on the all-optical ATTA method. By using the optical excitation scheme in ATTA, the memory effect is significantly suppressed, allowing us to reduce the sample size to 1 kg. The performance of the new all-optical ATTA dating method has been verified with ice core samples from Taylor glacier. Recently we have performed 81Kr-dating on the bottom ice from the GISP2 site in Greenland. The results may shed light on the evolution history and stability of the Greenland ice sheet.