Charged particle activation analysis of ultra trace levels of nitrogen in silicon at the Nishina Memorial Cyclotron Center, JRIA

Kazuyoshi Masumoto, Hirochika Yagi[*1], Tadashi Nozaki[*2], Yoshitaka Minai[*3]
Shoji Futatsugawa[*4], Yoshihiro Saitou[*4]

High Energy Accelerator Research Organization
1-1 Oho, Tsukuba 305-0801, Japan

[*1] Sumitomo Heavy Industry Examination and Inspection
Toyo, Ehime 799-1393, Japan

[*2] Purex Co.
735 Nippacho, Kohoku, Yokohama 223-0057, Japan

[.*3] Musashi Univ.
1-26-1 Toyotamakami, Nerima 176-8534, Japan

[*4]Nishina Memorial Cyclotron Center, Japan Radioisotope Association
348-58 Tomegamori, Takizawa 020-0173, Japan

Abstract

Charged-particle activation analysis (CPAA) has been used for the determination of light elements in various high purity materials without the effect of its chemical state and the contamination caused by atmosphere. In this work, CPAA of ultra trace amount of nitrogen in silicon has been tried at Nishina Memorial Cyclotron Center, JRIA. We adopted the $^{14}N(p,\alpha)^{11}C$ reaction for the activation of nitrogen. After being examined the behavior of ^{11}C in its chemical separation from the bombarded silicon, we improved the reliability and accuracy of charged particle activation analysis.. Nitrogen of 10^{14} atoms/cm^3 level in CZ silicon has proved to be determined by both methods, which gave results agreeing fairly well with the result of CPAA of SHIEI and SIMS.