

고순도 Nb판재의 상온 및 고온 성형성 평가

권용남¹, 손영욱², 김상우¹, 이영선¹

Formability of high Purity Nb Sheet

Y.-N. Kwon¹, Y. W. Sohn², S. W. Kim¹ and Y. S. Lee¹

Abstract

Radio frequency cavities are used to accelerate charged particles to high speeds. Recently, the use of superconducting radio frequency (SRF) cavities has become widespread in particle accelerators and the typical operating temperature of SRF cavities is between 2.1 and 4.2 K. The SRF cavities are usually serially connected elliptical shells to resonate high frequency electrical fields and are made of pure niobium with high residual resistivity ratio (RRR) (>200).

Mostly Nb cavities are fabricated by deep drawing of half cells from sheet and welded into a piece with electron beam. Hydroforming and spinning are other techniques to fabricate superconducting Nb cavities which are being developed recently. There is worldwide interest in new superconducting accelerators for elementary particle physics and new generation synchrotron light sources.

In the present study, basic formability tests at both room and elevated temperatures to collect plastic behaviors of pure Nb sheet. With those data, a series of simple simulation for half cell drawing was carried out for superconducting Nb cavity fabrication.

Key Words : Nb, superconducting cavity, deep drawing

1. 한국기계연구원 부설 재료연구소
2. 포항가속기연구소
교신저자: 권용남, E-mail: kyn1740@kims.re.kr