OXYGEN DIFFUSION IN RRR NIOBIUM DURING HIGH TEMPERATURE BAKING*

Past oxygen diffusion measurements were mostly conducted with commercial grade niobium. RRR measurement of furnace treated niobium samples showed the oxygen diffusion rate in high purity niobium can be much different from past measurements. Samples were baked in furnace at various conditions and subsequently etched incrementally before RRR measurement. Compared to the oxygen concentration of reference niobium sample, a new O diffusion constant can be obtained by the RRR method..

Table 1: Table 1: RRR measured for samples baked without Titanium shield

Sample	Before bake	Baked 650°C 10 h	BCF rem of 8
Sample P	400	165	

Oxygen Partial pressure = 9x10-8 Torr



Figure 1: Sample suspended into the Ti tube.



Figure 4: The polluted layer is around 100 µm with O concentration around 1300 weight ppm. 4 ppm initial O concentration is assumed and sticking coefficient is at 0.5.



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Sample	Before bake	Baked 650 °C 10 h	[Torr]
Sample P	400	165	9.0×10 ⁻⁸
Sample 1	370	271	2.6×10-8
Sample D	401	387	~1.1×10 ⁻⁸



editorial help.