

The Failure Analysis of the Turbine for Helium Cryogenic System at Taiwan Light Source

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There are two helium cryogenic system with maximum 450W cooling capacity, which were installed for five superconducting magnets and one superconducting RF cavity at Taiwan Light Source (TLS). One of these two helium cryogenic system was shut down due to the failure of first stage turbine, as called as T1. The T1 was replaced twice and failure just in the beginning with the attempt to produce liquid helium. Most of the failures for the turbine were caused by gas purity or material fatigue. The major reason for our case may not only cause by the above reasons, since the analyzer shows good purity of the helium gas. There's one auxiliary component may introduce the damage of the T1, because of the relevant parameters indicated the abnormal phenomena before T1 damage. This paper was aimed to present the study of the failure of T1 and the relevant operation parameters. The test of the auxiliary component of T1 was also presented and discussed.

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