

Sealed gaseous photomultiplier with CsI photocathode

A sealed gaseous photomultiplier tube (PMT) with a CsI photocathode has been developed using a micropattern gas detector (MPGDs) made of Pyrex glass. By employing a microblasting technique completely different from that used in microchannel plate (MCP) production, we successfully produced the new hole-type MPGD using Pyrex glass (microblasted glass plate: MB-GP). The glass is well suited for the high level of cleanliness and the reaction conditions required for the production of alkali photocathodes. To evaluate the characteristics of the MB-GP, we constructed a sealed gaseous PMT with CsI photocathode fabricated onto a Quartz glass. We investigated the gaseous PMTs with the semi-transparent CsI photocathode for two different gas mixtures of Ne (90%) + i-C₄H₁₀ (10%) and Ne (90%) + CF₄ (10%) at a gas pressure of 700 torr. Gains of up to 10^5 were attained with the cascaded MB-GP for both neon gas mixtures. Quantum efficiencies of up to 0.5% were obtained for UV lights at the wavelength of 170 nm. The gaseous PMT provides a fast charge signal with a 22 ns rise time for the scintillation light from a BaF₂ crystal irradiated with a ⁹⁰Sr source. This latest result and the basic performance of the gaseous PMTs are described.

Summary (Additional text describing your work. Can be pasted here or give an URL to a PDF document):

http://ksprite.kj.yamagata-u.ac.jp/~tokanai/Y/summary_VCI-2010-FT2.pdf

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