ORAL PRESENTATION

Helium permeation through Zerodur glass

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In the pursuit of a new optical pressure standard [1], Ultra-Low Expansion (ULE) glass cavities were proposed as a means of measuring helium refractivity. However, the utilization of ULE glass gave rise to certain complications, with the pumping effect on helium being a significant issue [2]. As a solution, Zerodur glass was suggested as an alternative material for the cavity. To estimate the flow of helium gas through Zerodur glass, knowledge of the permeation constant K and the diffusion constant D is necessary. These parameters are related through the solubility S of helium in glass, as $K = S \cdot D$. In this research work, we experimentally measured the permeation of helium gas in Zerodur over a temperature range of 27 – 120 ℃. Our results indicate that Zerodur has potential as a material for the new quantum standard of pressure.

References:

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