Storage life evaluation of multi-walled carbon nanotubes non-asbestos gaskets based on the Arrhenius model

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Abstract

In order to accurately and quickly predict the storage life of non-asbestos gaskets, on the basis of accelerated aging tests in a hot air environment, the acceleration coefficients at different accelerated temperatures were calculated to simulate the storage aging process of the gaskets. According to the relationship between performance change of the gasket and aging time, used the Arrhenius model and taking compressibility as the performance index, obtained the relationship between the compressive performance change and storage time of sample 1 (with multi-walled carbon nanotubes (MWCNTs)) and sample 2 (without MWCNTs added). The results show that the compressive properties of the non-asbestos gaskets gradually deteriorated with the prolongation of the aging time or the increase of aging temperature. An aging life model under a storage environment was established to evaluate the storage life of non-asbestos gaskets at 25 °C. The extrapolation results show that the storage life of the gasket with MWCNTs was 2.91 years and 1.81 years for the storage life of the gasket without MWCNTs at 25 °C. Thus, adding MWCNTs can effectively improve the storage life of non-asbestos gaskets.

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