

Study of the Effect of Gas Contamination in Stirling Cryocoolers

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One of the most important characteristics of spaceborne stirling cryocooler is its reliability over a lifetime. The wear abrasion and gas contamination existing in stirling cryocooler are the main failure modes that influence the reliability of spaceborne stirling cryocooler. While design improvements have reduced the probability of the wear abrasion, the excessive gas contamination is still a major risk, typically in excess of 10 years. Aimed at gas contamination failure mode in stirling cryocooler, experiments were realized in order to study the effect of contamination on the working gas in the stirling cryocooler operating at 60 K in the paper. The accelerated contamination experiments were performed to quantify the effect of impurity gas. The curve of the outgassing rate in the stirling cryocooler as a function of the time was obtained and discussed. The results supported the reliability design and test of stirling cryocooler.