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【摘要】

在真空製程設備當中，真空幫浦是真空腔體保持真空環境的動力。而冷凍真空幫浦（Cryopump）利用極低溫環境低溫冷凝、低溫吸附及低溫捕獲等三種方式，冷凍系統採用以氮氣作冷媒的閉迴路二級Gifford-McMahon (G-M)冷10~20 K及50~80 K二部分。且由於冷凍真空幫浦大量應用於高科技行業的昂貴高潔淨高真空製程設備當中，因此性能及相關產業的製程與生產流程。本論文依據國際測試規範建置冷凍真空幫浦性能量測系統及所建議的實施步驟將加熱器直接置放於冷凍真空幫浦內部第二級冷凝面的頂端與置放石英燈加熱器於冷凍真空幫浦所連接的測試腔體後對幫浦的抽氣性能研究。結果發現當加熱器功率為15W且分別通入氮氣與氬氣時，抽氣速率明顯下降，其範圍在1,393~2,469 liter/sec及1,393~2,469 liter/sec。而在再生程序中則以搭配使用不同內、外部熱源及氮氣掃氣進行再生，探討冷凍內部第二級冷凝面頂部的加熱器但不使用氮氣掃氣時能擁有94%的再生效果且又能同時擁有最節省支出成本及總

【英文摘要】

Among the vacuum equipment, vacuum pump is the power to maintain vacuum environment in the vacuum cavity gas inside a vacuum chamber for pumping effect. The pumping mechanism includes cryocondensation, cryosorption stage Gifford-McMahon (G-M) closed-loop gaseous helium cryopump; the model was ULVAC-10PU and the temperature. Since cryopump is widely applied to expensive vacuum equipment in high-tech industry, thus, the functions and performance of the vacuum equipment significantly, as well as the production process of related industries. This system in accordance to the international test standard and suggested procedures, and conducted tests on pump when heated. The test methods included placing the heater directly on the top of the second-stage surface inside the center top of the test cavity connected to the cryopump, and both were tested for effect of the transmission of heat. The results showed that when the heater power was 15W, and nitrogen and argon were inputted respectively, the pumping speed was 367.4~1,001.1 liter/sec and 380~934 liter/sec. The maximum throughput of quartz heater was 20W. As the quartz heater power decreased, but the cryopump was able to function normally. The range was 1,470~2,492 liter/sec and different internal and external heat sources and nitrogen scavenging were used for regeneration, in order to discuss the lowest cost and shortest regeneration time.

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