Abstract

A LabVIEW™ 2009-based remote and process control program for an ultra-high vacuum system and a variety of surface science experiments is presented. The apparatus consists of five individual recipients for sample preparation, surface analysis, scanning tunneling microscopy and a central chamber connecting them by means of gate-valves. All processes like electron-beam heating, ion sputtering, gas exposure, thermal and electron-beam evaporation, analysis techniques, sample manipulation can run under full automatic control; transfers are supported.

A variety of useful auxiliary functions are implemented to control bake-out processes, titanium sublimation pumps, pressure regulation of leak valves but also data acquiring, automatic reporting through ftp and emails, as well as external communication and control via a TCP/IP connection with a portable PC. Important features of the software include a time-control module to operate up to five channels (repetitive heating, sputtering, gas exposure,
evaporation and manipulation to evaporation positions) as well as full process control. Such tools allows us to set up automatically processed experiments that include e.g. the preparation of single-crystal surfaces, their AES (Auger electron spectroscopy) and LEED (low energy electron diffraction) analysis as well as the evaporation and various treatments of thin films.

Reference

- Mütterlein, B., Handbuch für die Programmierung mit LabVIEW: Spektrum Akademischer Verlag, Heidelberg 2009

Index Terms

Electronics
Automation

Key words

surface science
LabVIEW
remote control.