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Smart Combinatorial Research Equipment (SmartCoRE) for Sample Environmental Control and Automated Analysis with Optical Methods[1] MATTHEW CHURCH, XIAODONG DING, NORMAN NANTEL, Jema Science Inc., SMARTCORE TEAM — Combinatorial research (CR) has revolutionized the way research is done in every major chemistry, physics and material science laboratory. We propose to bring the same success of automation and capabilities of CR to a widely used technique, small- and wide- angle x-ray scattering (SAXS/WAXS) through our development of a small, modular sample environmental chamber with embedded control electronics that can easily be used in large arrays. The device however is not restricted to a SAXS/WAXS techniques as it can easily be adapted to almost any kind of small volume sample prep or optical analysis technique requiring control of basic sample environmental parameters such as temperature, atmosphere, light and electromagnetic fields. The prototype has the following capabilities: 1. Automated switching of external electronic instrumentation between modules. 2. Thermoelectric temperature control from -50 to 200 C. 3. Ports for gas flow through or evacuation of sample environment. 4. Sealed sample environment using minimally scattering window material. 5. 90 degree field of view of both sides of sample. 6. Optional fiber-optic connections for UV-Vis spectroscopy. 7. Optional GISAXS mounting geometry. 8. Optional liquid sample flow cell.

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