

W0456

CrystalMation: Capacity, Reproducibility and Efficiency of a Fully Integrated Automatic High-Throughput Crystallization Platform. Jian Xu, David Robbins, Rollan Mosko, Matt Lundy, Tom Vorndran, Mandel Mickley, Michael Willis, Rigaku Automation, 5999 Avenida Encinas, Suite 150, Carlsbad, CA 92008.

CrystalMation is the first fully and seamlessly integrated robotic system commercially available on the market for automating the crystallization process from protein to crystal. It consists of crystallization screen creation, plate setup, reservoir & protein dispense, plate storage & handling, image inspection & scoring, one-click optimization and software applications for experiment management and decision making. We report here a system successfully built and optimized for JCSG and IAVI, which has been shown to meet the high-throughput criteria. Large scale, systematic and functional tests have been performed on the system, including various volumes, proteins, screens, and plate types. The results indicate the system sets up 96 well SBS format plates at a rate of 4.5 minutes per plate or less. Liquid dispensing was consistent and reproducible, even at low volumes. Inspections of all plates were completed within individually specified schedules and stored in the database. The statistics from this large dataset also suggested that all crystallization conditions that give rise to crystals were repeatable.

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