

Gentle Equilibration of Macromolecular Crystals to New Solutions with Minimal Handling

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Changing solutions conditions of macromolecular crystals is often labor intensive and fraught with potential for damage to the samples. Here we show two approaches to crystal equilibration that are low cost, gentle, and require less handling than traditional approaches. First, we use an open source syringe pump with a crystal sitting in a small liquid reservoir to gradually change the crystal solution with user defined temporal concentration gradient. Second, we use aerosols delivered via two different means (in situ in a vial and in an open stream configuration) to crystals sitting on a loop mount. Both methods can be used to gradually change solution conditions for crystals that otherwise will suffer substantial damage when transferred directly into the new solution. The approaches utilize diffusion as the primary means of transport of solution exchange, reducing errors caused by pipetting, saving time, and improving crystal quality after solution exchange.