How can windows or ATR crystals be cleaned?

To clean optical elements, most people use cotton-tipped applicators with a suitable solvent. The applicators must be the kind that are free of any extra chemicals, oils, etc. Suitable solvents for various optical materials are given individually for the materials in the special section on optical materials. In general, avoid the use of water or solvents with water when cleaning salts (e.g., KBr, NaCl). Many non-salt materials can be cleaned with water. Many materials in general can be cleaned with organic solvents such as alcohol, acetone, and methyl ethyl ketone (MEK). The end of the applicator is dipped in the solvent. Then the applicator is gently rubbed against the optical element. This process is repeated with a new applicator until the optical material is clean. (A used applicator is never re-dipped in the solvent.) MEK is a particularly good solvent for cleaning optical materials, because of its high volatility. If evaporation of a thin film of MEK from the optical material surface occurs in patches, the surface is probably not clean. If the same film seems to disappear all at once, the surface is probably clean.

Another method of cleaning windows and ATR elements is to use an ultrasonic cleaning bath. With this equipment, cleaning is accomplished without abrasion. (Such cleaning baths are available through the major laboratory equipment suppliers.) The optical elements are placed in a tray or shallow bottle, on top of a soft material (e.g., PTFE), so that no two elements are touching. The elements are then covered with a suitable solvent and the cleaner turned on for approximately one hour. Non-contact cleaning of optical elements may also be accomplished using a low power plasma cleaner

One common method to verify that the window or ATR element is clean is to run a single beam spectrum and look for unusual peaks that were not present in previous background spectra using the same equipment.

Obviously, no amount of cleaning will restore an optical element which has been scratched, chipped, or broken. Minor defects can be corrected using the Harrick Optical Polishing Kit (OPK-1XX). If there is deterioration or damage just on the surface, it may be possible to reconditioning damaged windows and ATR elements. Note that a reconditioned optic is generally thinner than the original and may not meet the original operating specifications of the ATR accessory or cell.