

NANO 703/703L  
Lab: TEM Sample Prep-Ultramicrotomy  
Due: Following Lab Session

### GOAL

TEM requires samples thinned to electron transparency, typically less than 100 nm. Ultramicrotomy is one technique to prepare thin sections, using an especially fine, sharp knife, and a drive mechanism for precise thickness control. Diamond knives are preferred, for their durability and quality, but glass knives are inexpensive, disposable, and easily produced (Fig.). The goal of this lab is to become familiar with the function and capabilities of the ultramicrotome.

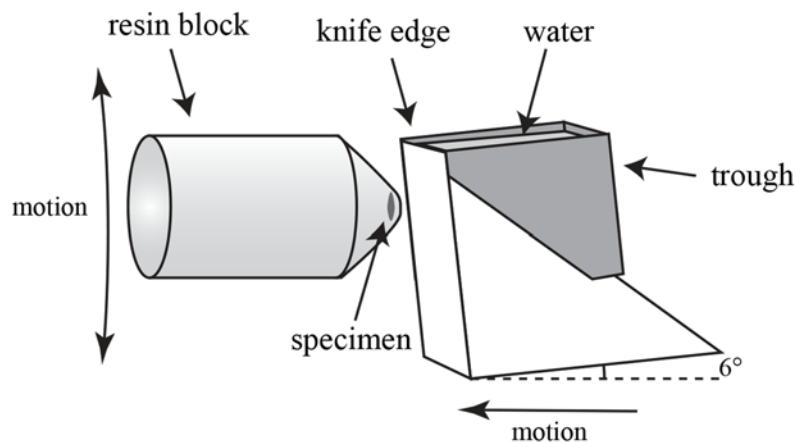


Fig.: Simplified drawing of ultramicrotome. A glass knife is prepared with a water trough. A specimen embedded in polymer resin is paced over the knife edge, which advances by a fixed distance after each pass. The knife is inclined for clearance after each cut.

### PROCEDURE

Please complete the following tasks:

- 1) Make a glass knife;
- 2) Familiarize yourself with the ultramicrotome;
- 3) Learn how to transfer the sections to a TEM grid;
- 4) Prepare at least one section for TEM.

### REPORT

Develop documentation describing an overview of the ultramicrotome components and a procedure for preparing TEM samples by ultramicrotome using a glass knife. The procedure should be adequately detailed to be followed by another researcher.