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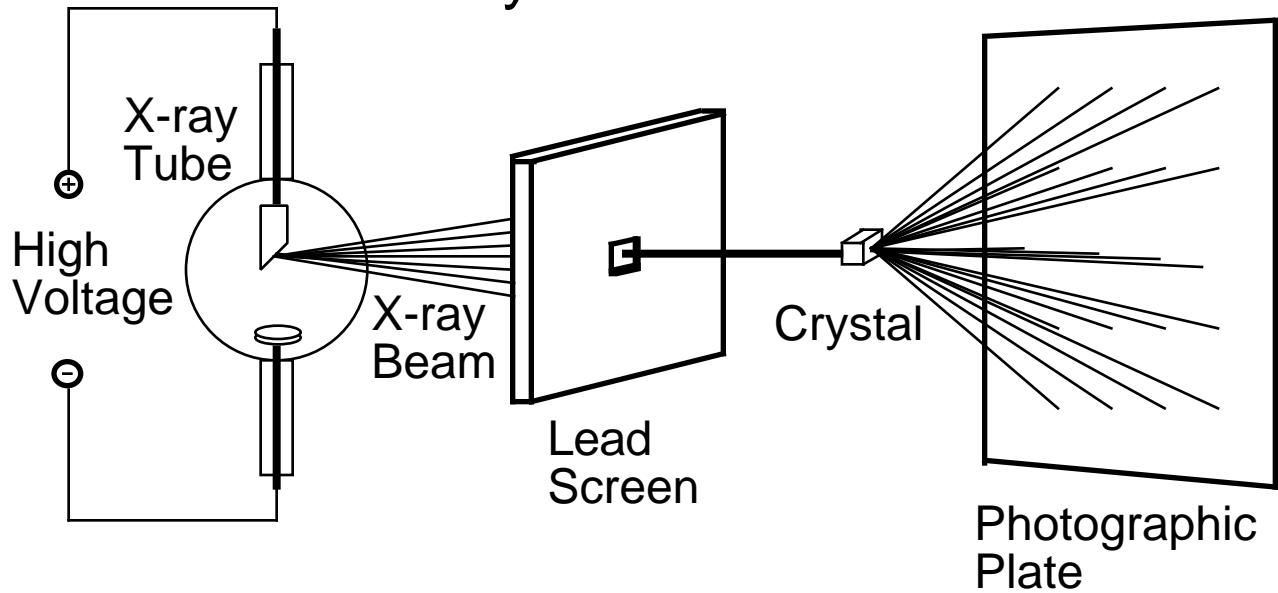
Laboratory Safety

DISCLAIMER

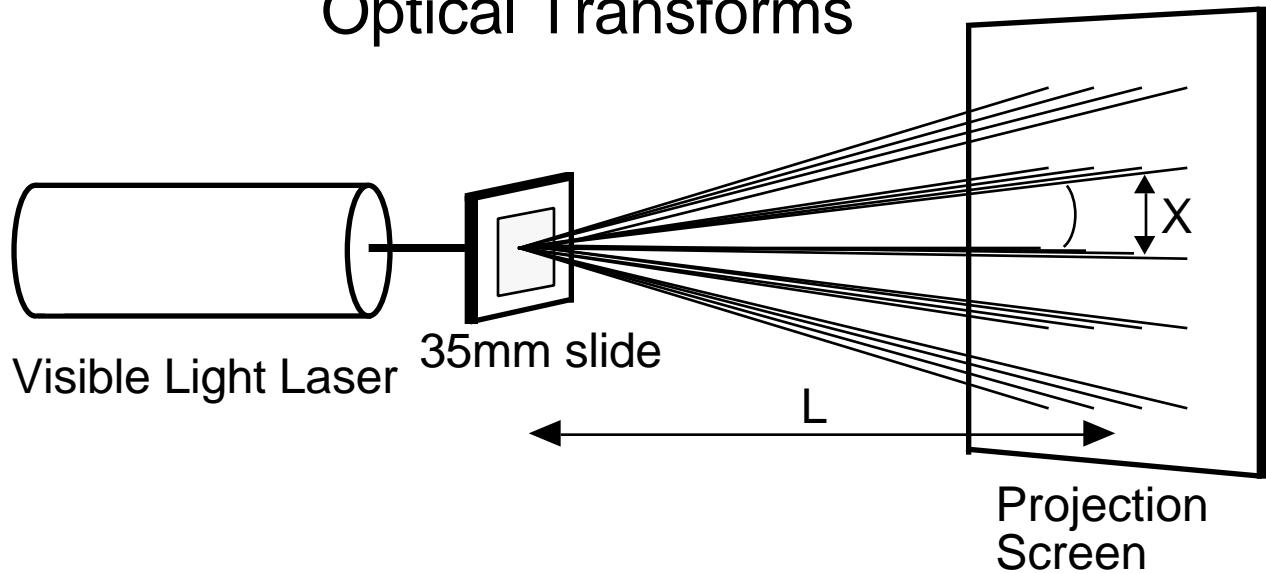
Safety information is included in each chapter of the Companion as a precaution to the readers. Although the materials, safety information, and procedures contained in this book are believed to be reliable, they should serve only as a starting point for laboratory practices. They do not purport to specify minimal legal standards or to represent the policy of the American Chemical Society. No warranty, guarantee, or representation is made by the American Chemical Society, the authors, or the editors as to the accuracy or specificity of the information contained herein, and the American Chemical Society, the authors, and the editors assume no responsibility in connection therewith. The added safety information is intended to provide basic guidelines for safe practices. Therefore, it cannot be assumed that necessary warnings or additional information and measures may not be required. Users of this book and the procedures contained herein should consult the primary literature and other sources of safe laboratory practices for more exhaustive information. See page xxv in the Text 0 Preface file in the Companion Text folder for more information.

Structure Determination

X-Ray Diffraction



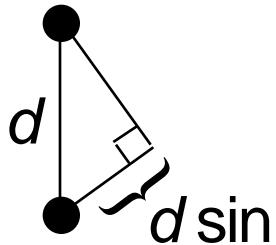
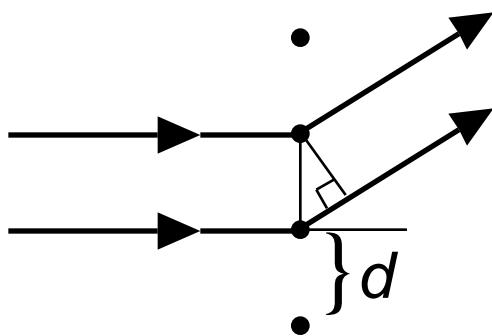
Optical Transforms



Diffraction Conditions

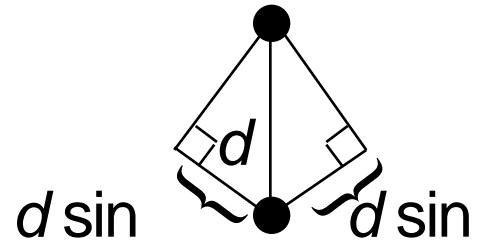
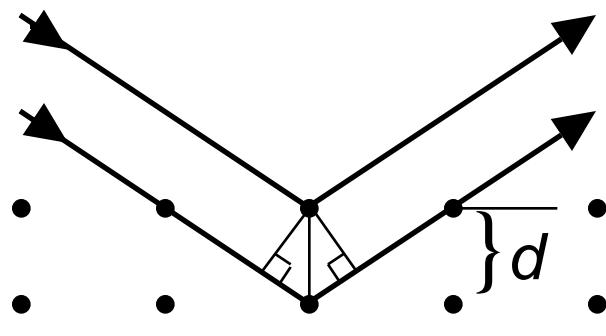


Fraunhofer diffraction

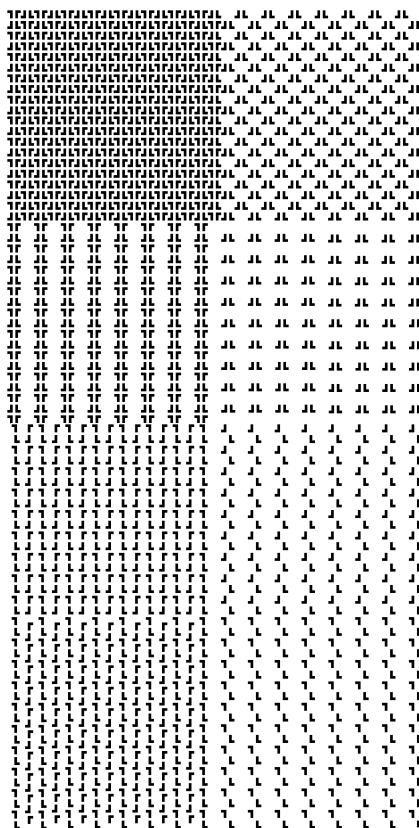
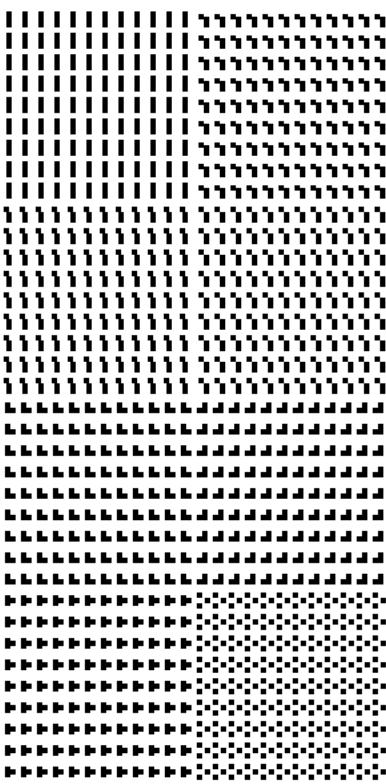
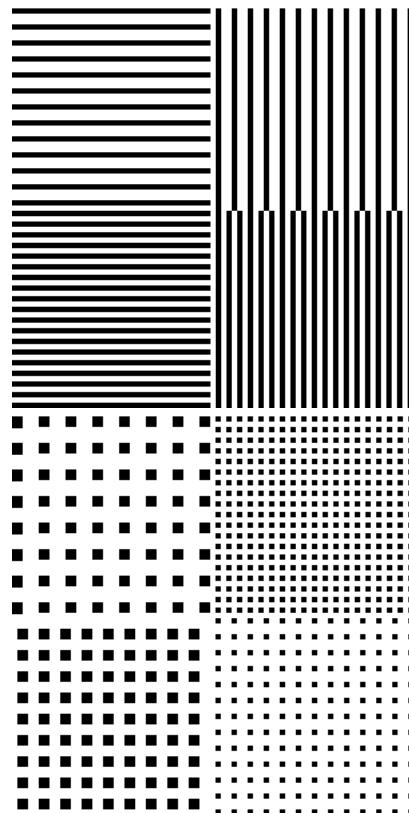
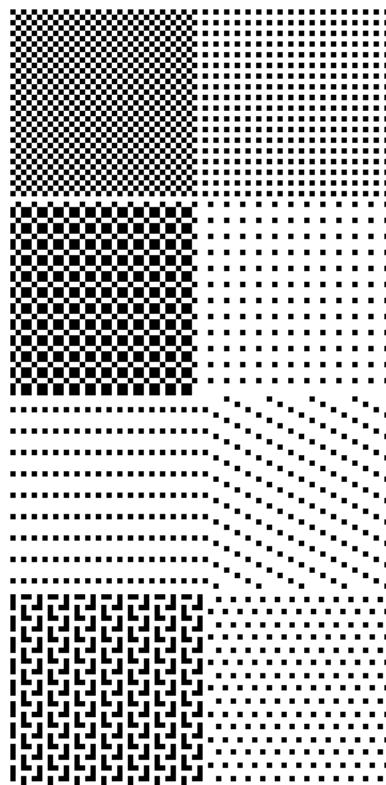


For constructive interference,
 $d \sin \theta = n$

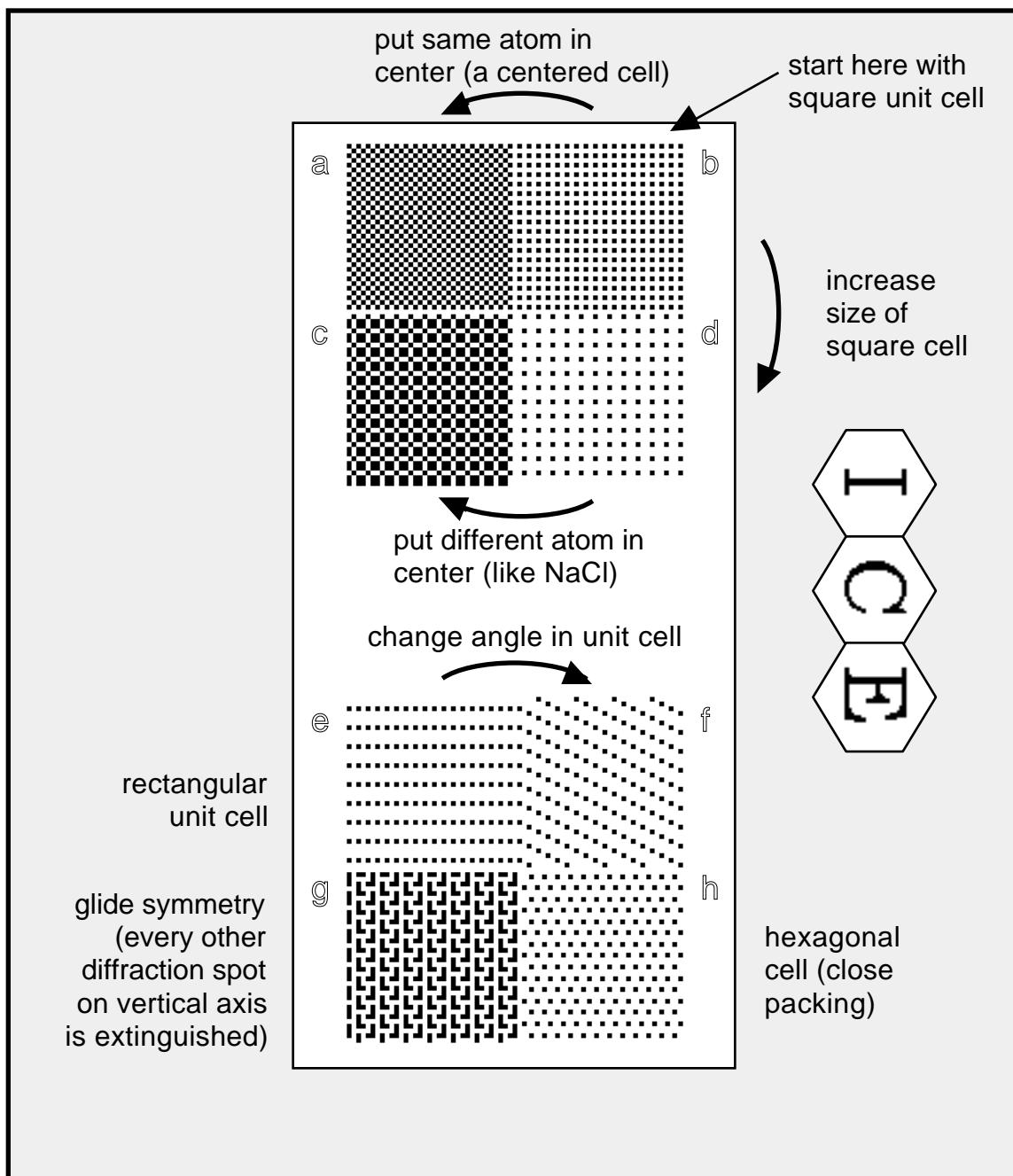
Bragg diffraction



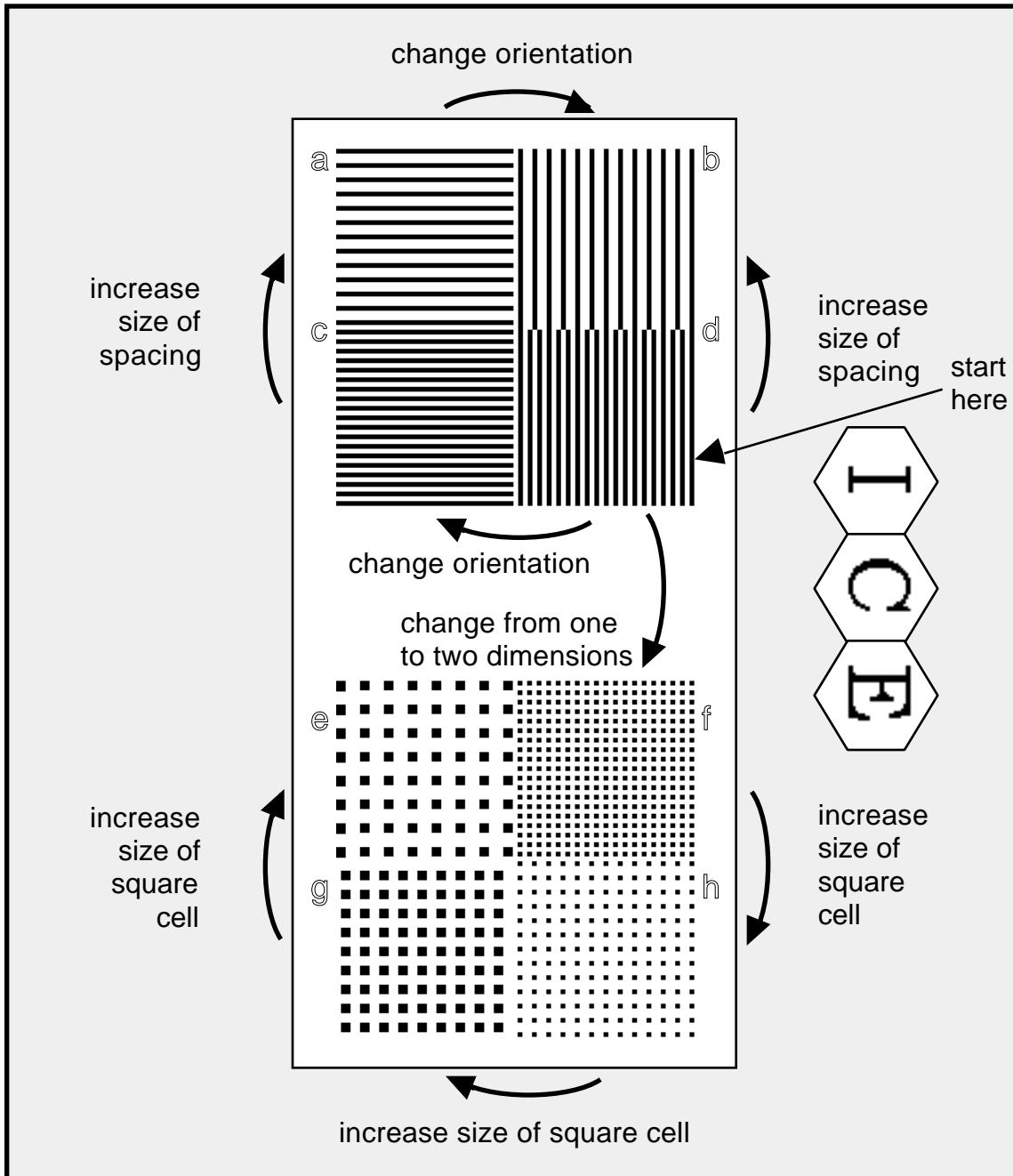
For constructive interference,
 $2(d \sin \theta) = n$



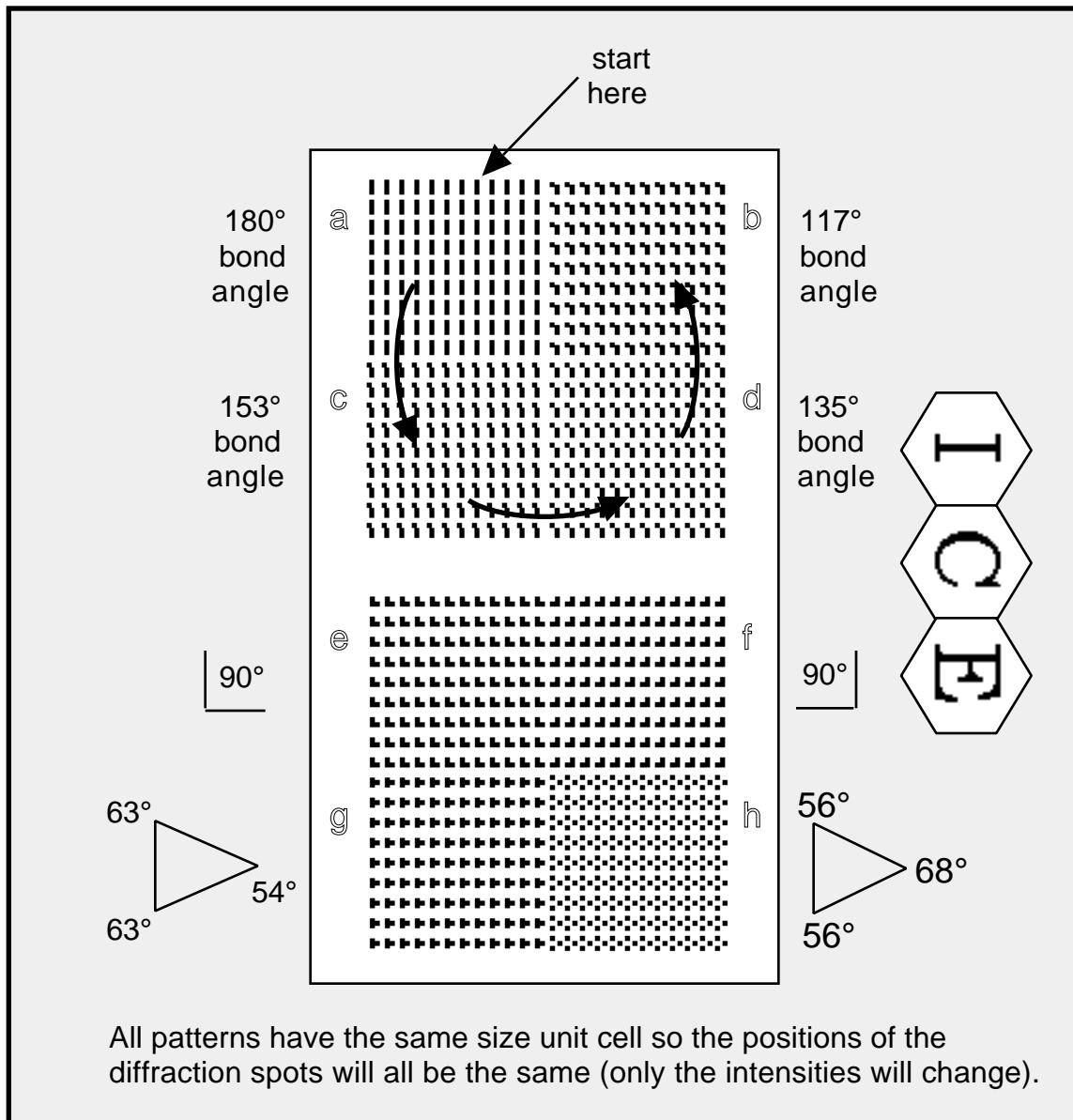
Unit-Cell Slide



Discovery Slide

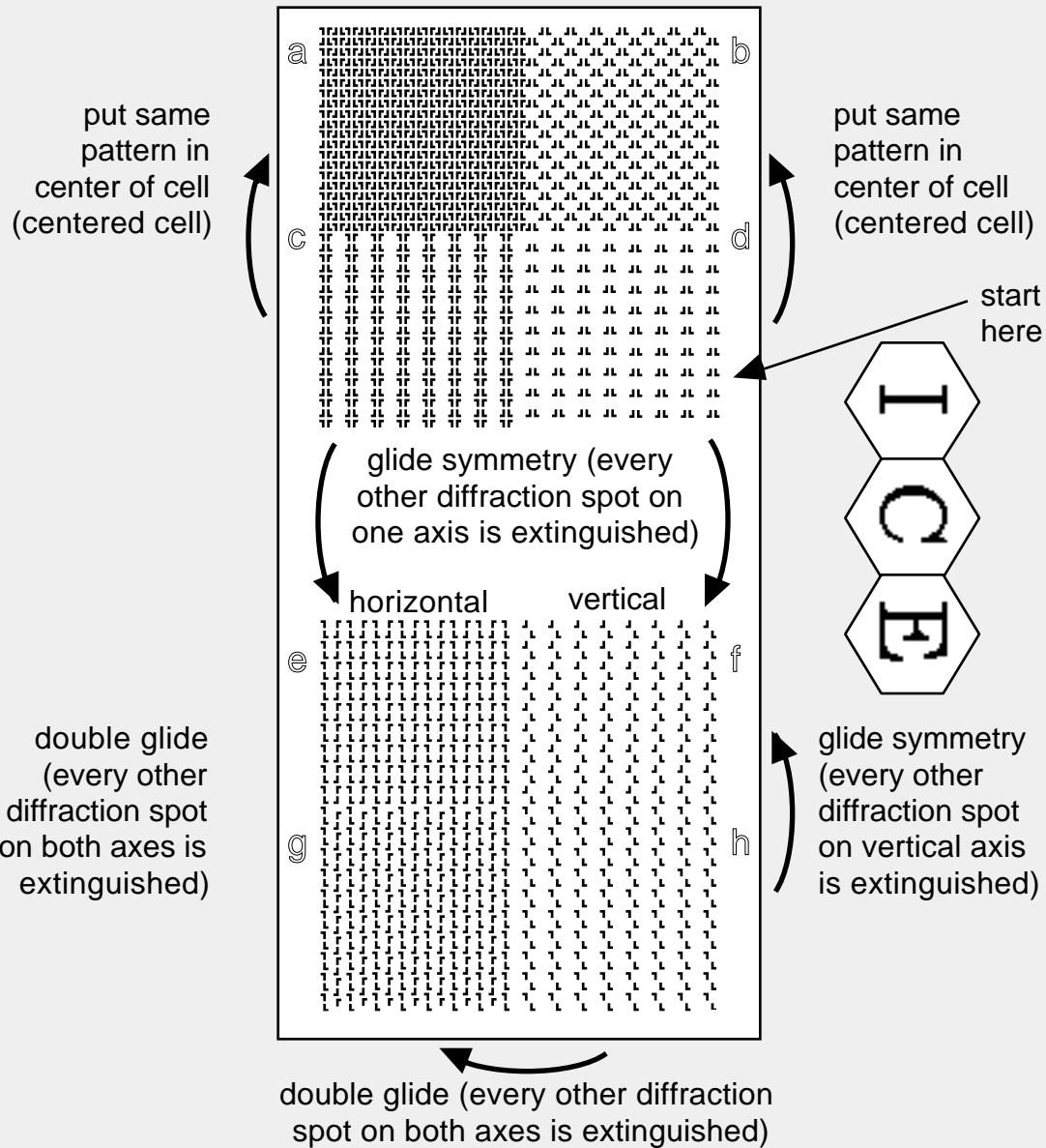


VSEPR Slide (structures of triatomic molecules)



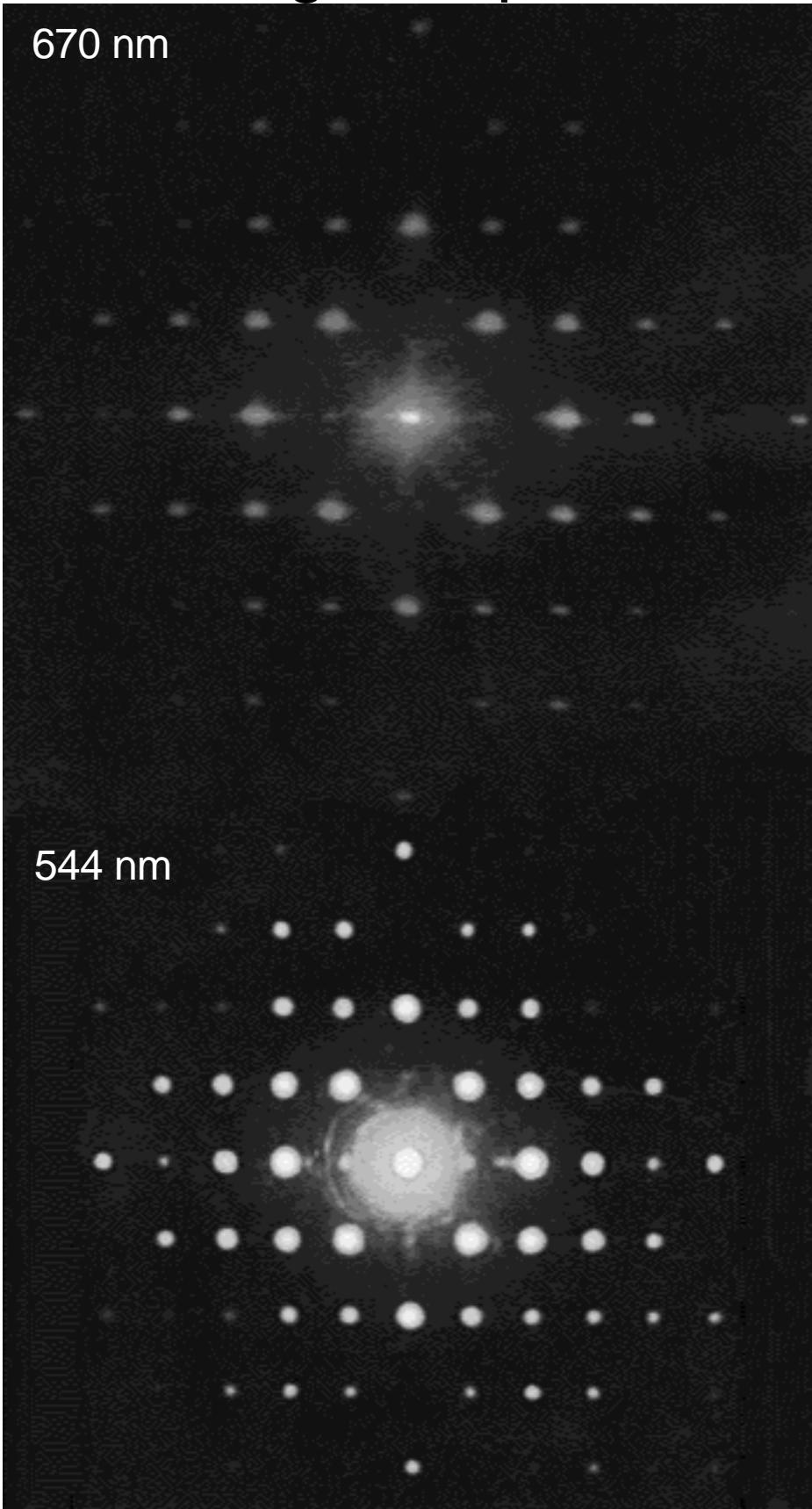
Plane Groups

All patterns have the same size unit cell so the positions of the diffraction spots will all be the same (only the intensities will change).

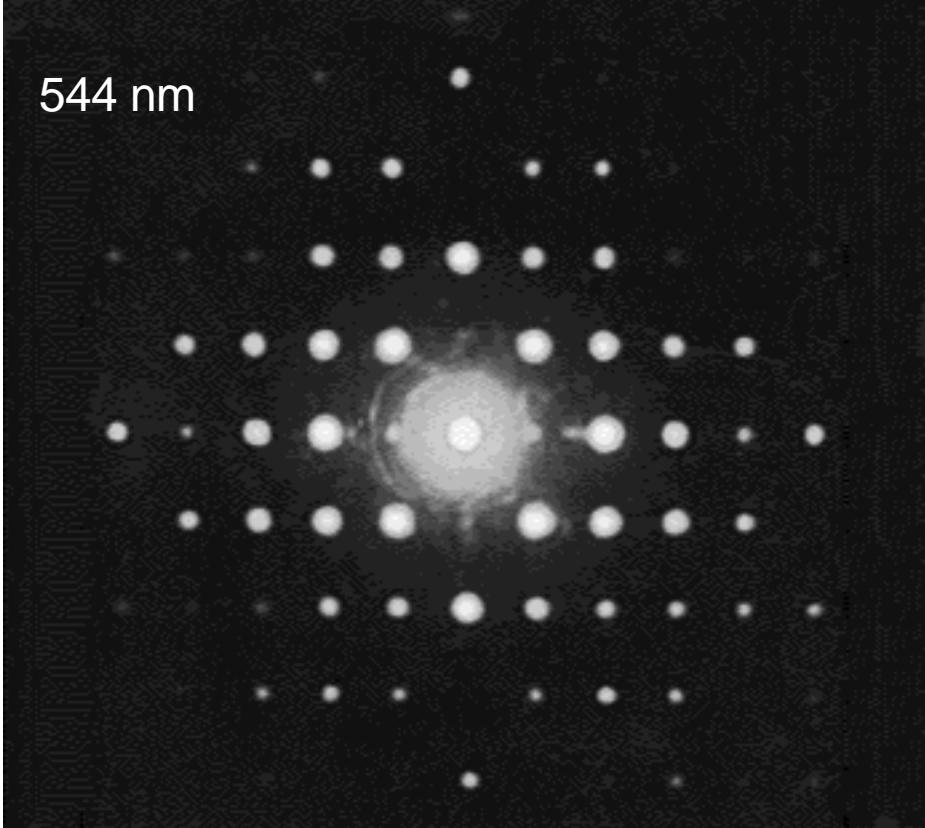


Wavelength Dependence

670 nm



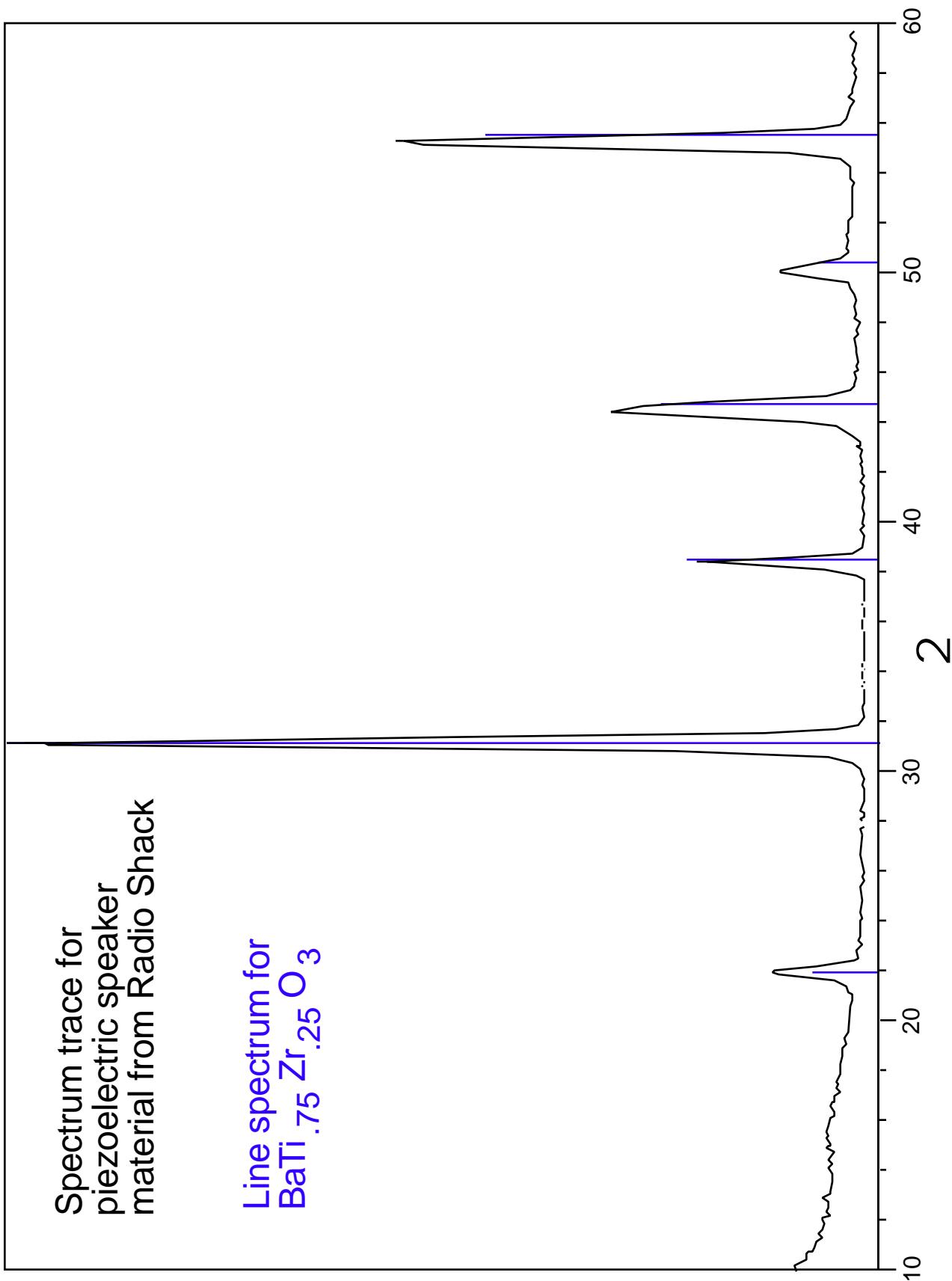
544 nm



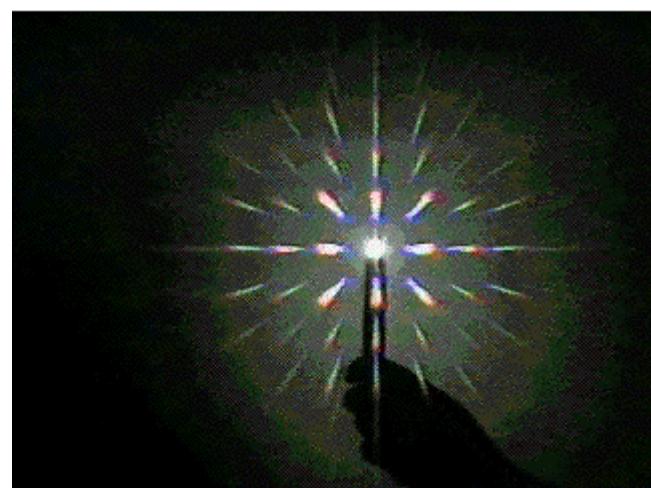
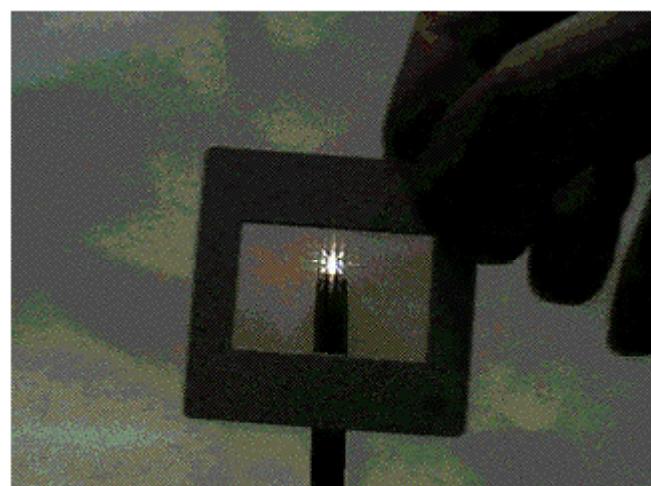
Spectrum trace for
piezoelectric speaker
material from Radio Shack

Line spectrum for
 $\text{BaTi}_{.75}\text{Zr}_{.25}\text{O}_3$

Intensity



Why use monochromatic light?



Powder Diffraction

