CATHODOLUMINESCENCE IN SEDIMENTARY PETROLOGY

MICHAEL OWEN
Department of Geology
St. Lawrence University
Canton, NY 13617

INTRODUCTION

Cathodoluminescence (CL) is widely used in sedimentary petrology, especially in the study of carbonate rocks. The factors governing CL intensity and spectral emission are now becoming known and CL is gaining acceptance as an important qualitative analytical tool.

This workshop will examine the application of CL to sedimentary petrography. A lecture session will discuss and evaluate CL in carbonates and in siliciclastics. Issues such as instrumentation, cement stratigraphy, discrimination of altered vs. unaltered skeletal material, sandstone framework mineralogy, porosity occlusion and pressure solution, and diagenesis will be discussed. Projection facilities will permit real-time examination of samples during discussion. A laboratory session will permit participants to gain experience with CL equipment and effects of operating conditions.

OUTLINE

Nature of CL in crystalline materials
Variability in CL
  Intensity
  Wavelength
Quenchers

Controls on CL
Chemical
  Major elements
  Trace elements
Physical (strain)

CL in rock-forming minerals
Silicates
  Quartz
  Feldspars
  Fe-Mg minerals
  Accessory minerals
Carbonates
  Calcite
Dolomite
Aragonite
Phosphates and others
Apatite

Cements

Diagenesis
Albitization
Carbonates
Pressure solution in sandstones

Instrumentation
Luminescences chambers
SEM-type sources
Microscopes
Spectrometers

Laboratory
Practical experience in operating a Nucleide ELB-2B w/spectrophotometer
Examination of participants samples