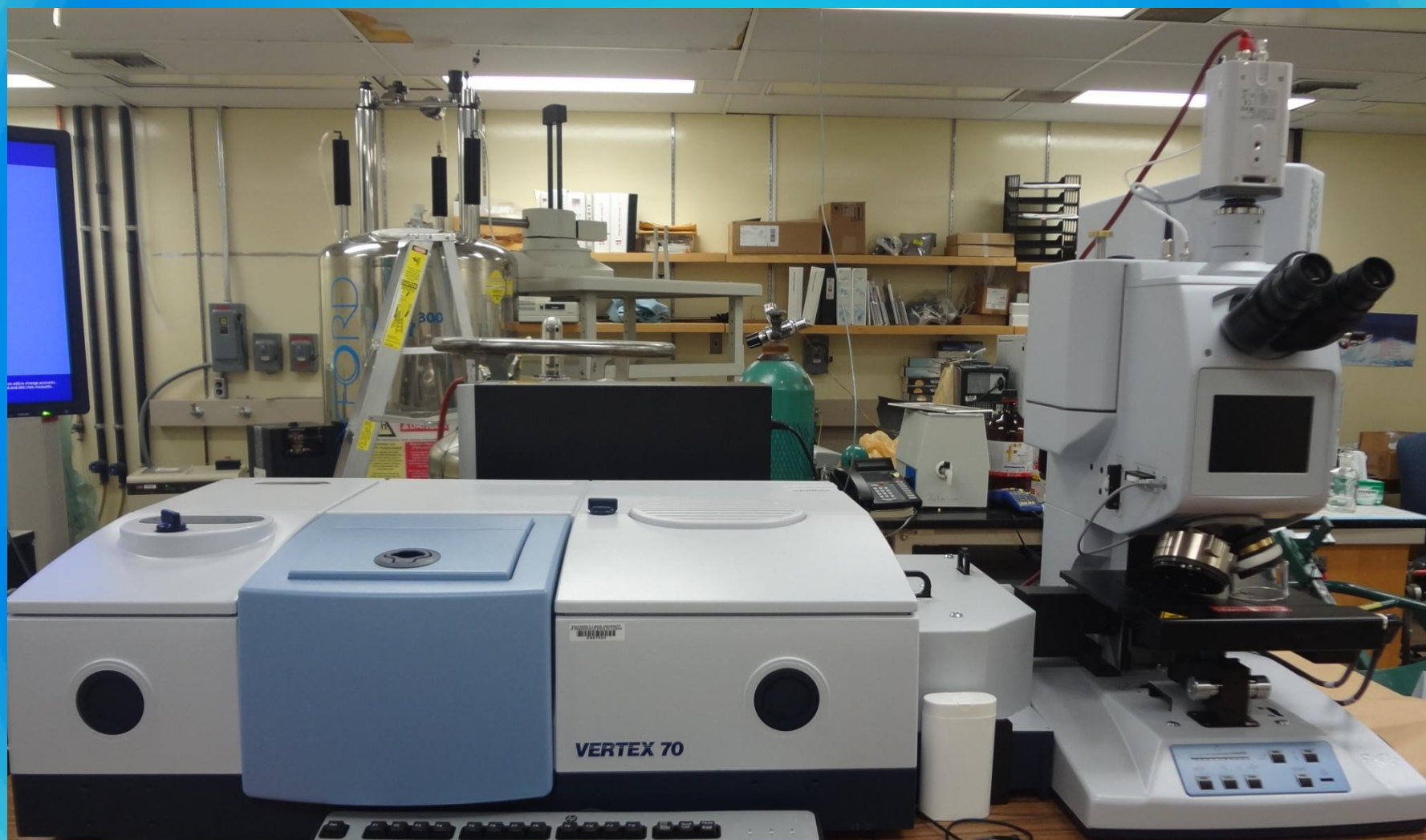


Using the Future to Study the Past: FT-IR Spectroscopy



By: Victoria Weaver

What is FT-IR Spectroscopy?



Spectroscopy

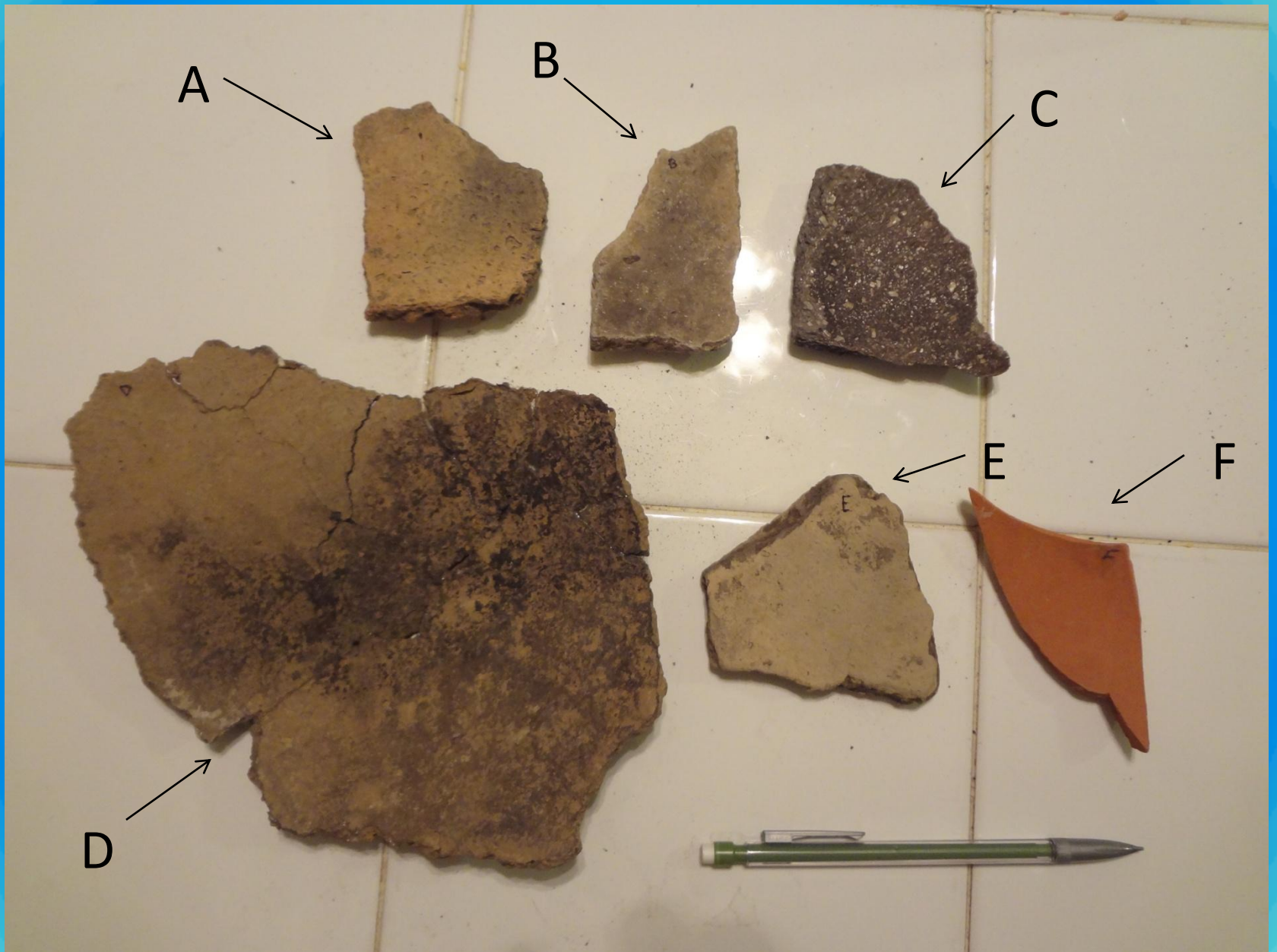
- Traditional spectrometers
 - Transmission
 - destructive
- SIUE's spectrometer
 - Non-destructive
 - Attenuated Total Reflectance (ATR)
 - Internal reflectance
 - 'Evanescent wave'
 - Crystals
 - Diffuse Reflectance
 - 15x objective
 - Comparable results to transmission mode

Research goals

- Comparable analysis
 - Objectives, modes, and samples
 - Comparisons between fired and unfired ceramics
- Sourcing, preservation, general chemical analysis

Samples: Ceramic Sherds

- Pottery Hill, Tennessee
 - Could be broken, manipulated
 - Representative sample
- Modern flowerpot
- Minimal to no cleaning
- Arbitrarily labeled



Samples: Clay

- Locations:
 - Southern Illinois University Edwardsville campus
 - 1A & 1B
 - 2A & 2B
 - Kampsville, IL
 - 3A & 3B
 - 4A & 4B
- ATR preparation



Methods

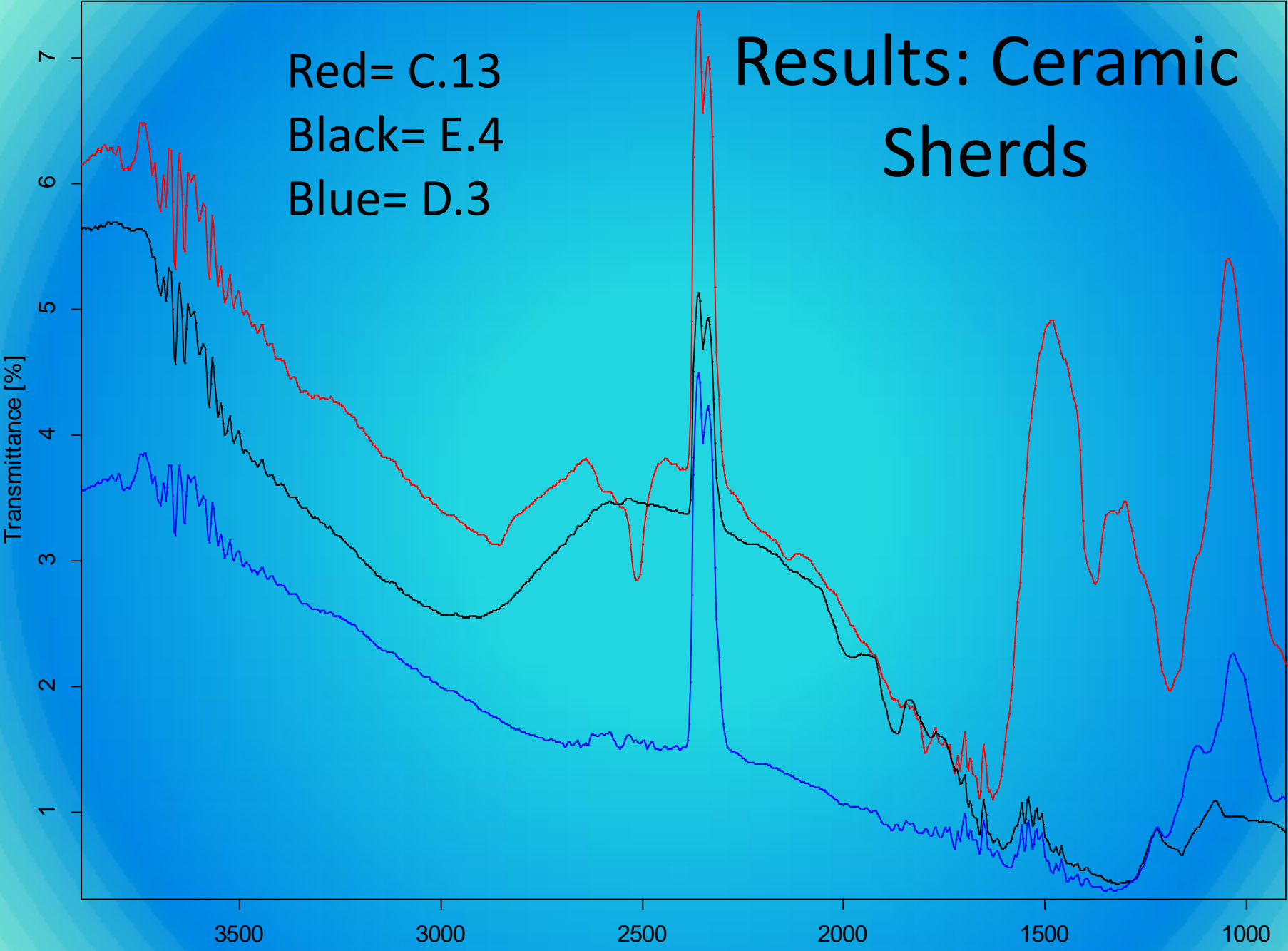
- Background scan
 - Filter noise
 - Gold mirror or crystal/air
- 100 scans per spectrum
 - No established methodology
- Photograph and mapping
- Sherd scans
- Clay scans

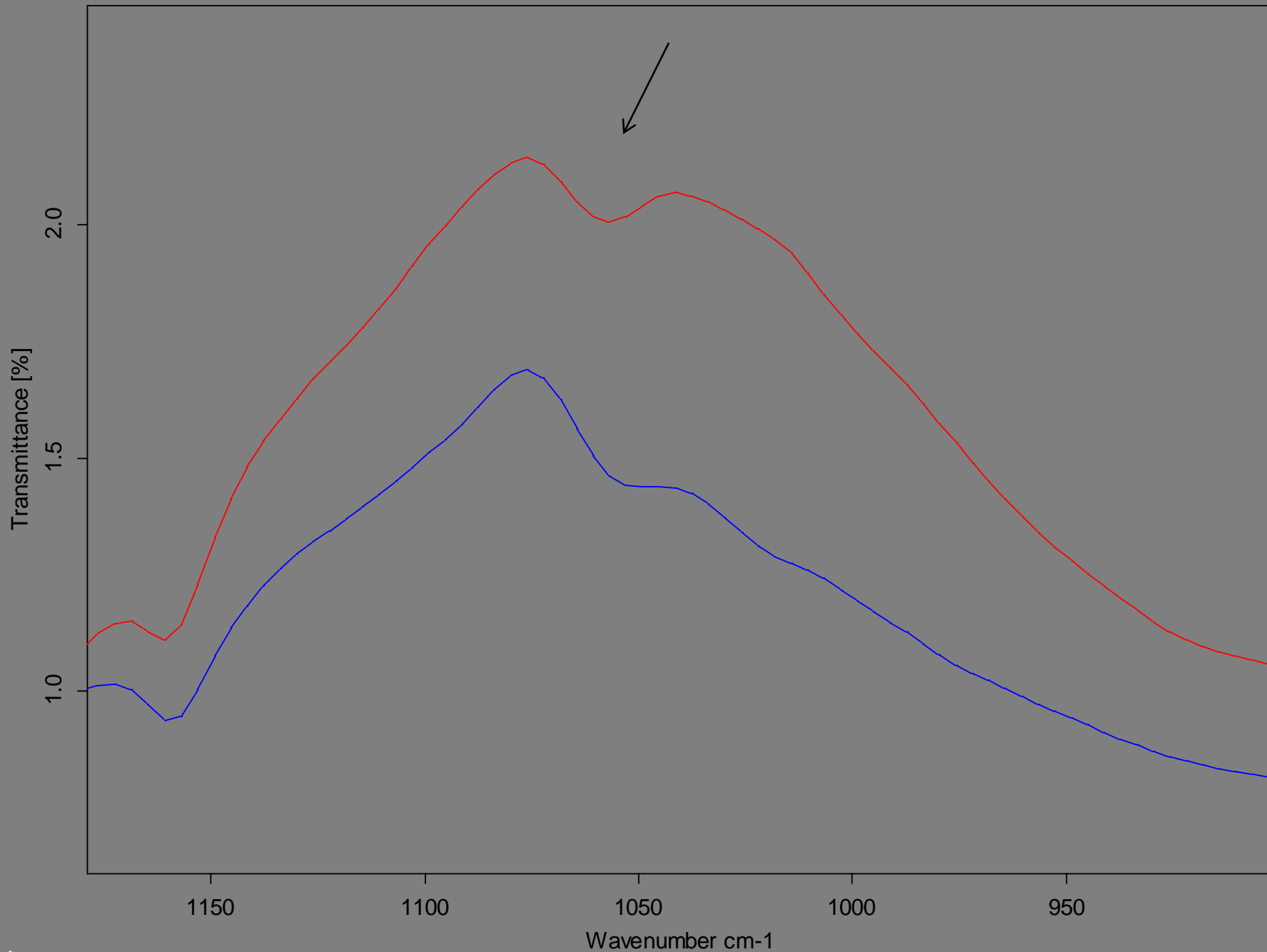
ATR vs. 15x

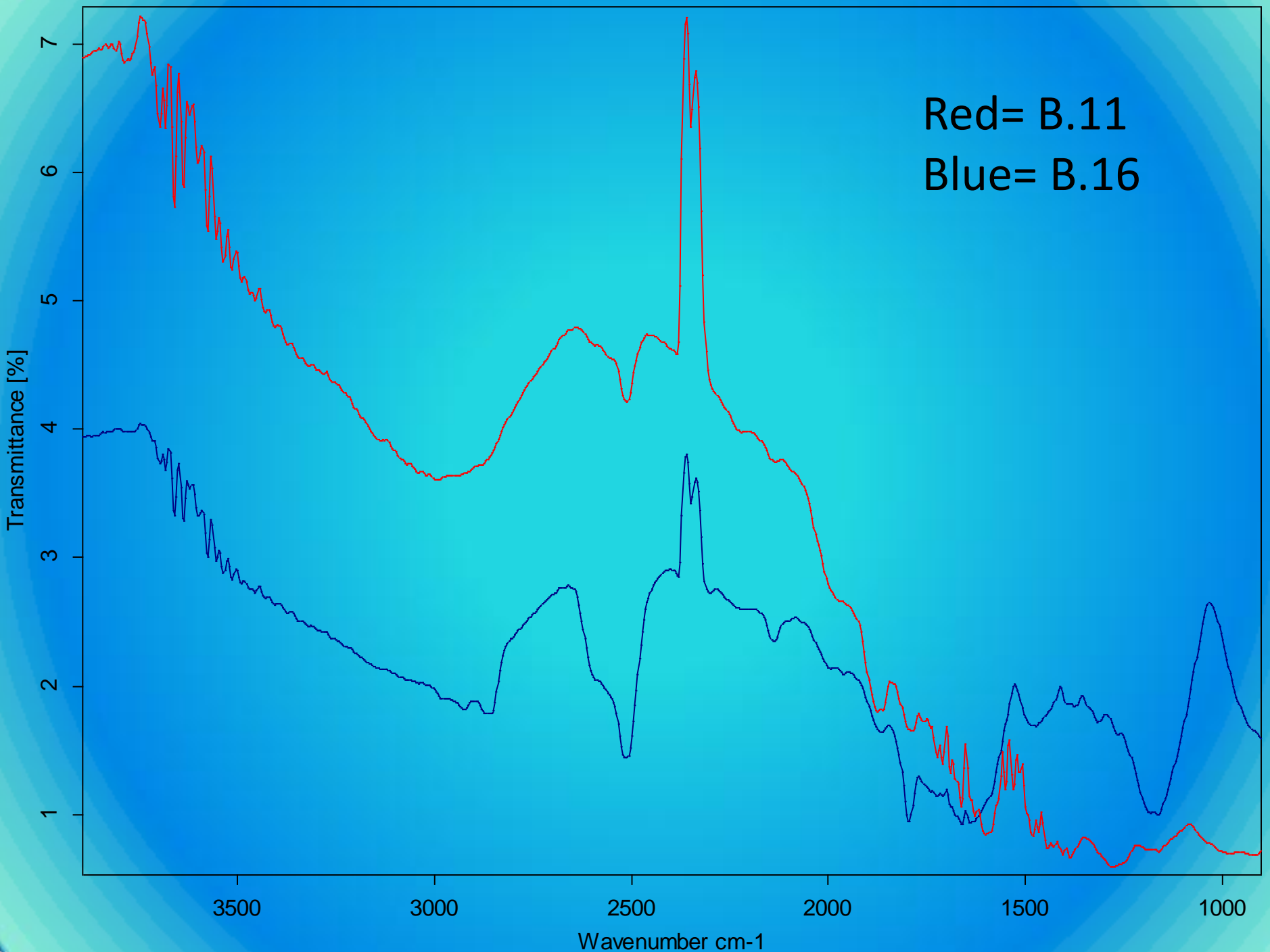
- ATR weak, undefined spectra
 - All samples taken
 - Not easily comparable to 15x
 - Further examination
- 15x objective clearer and stronger
 - 15x looks at larger area, want the 'recipe' of the sherd
- ATR marked as transmission units, appears as absorbance

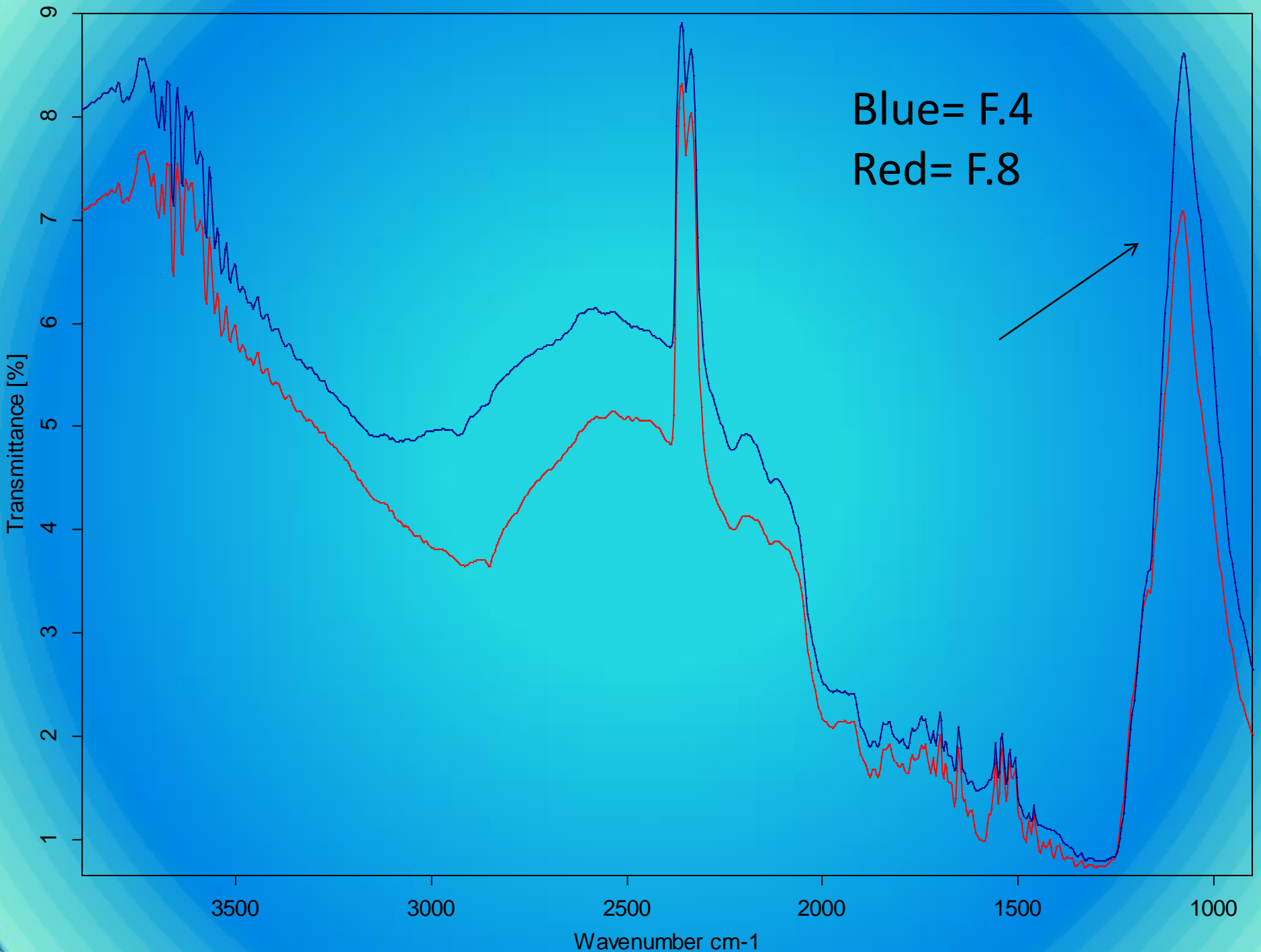
Results: Ceramic Sherds

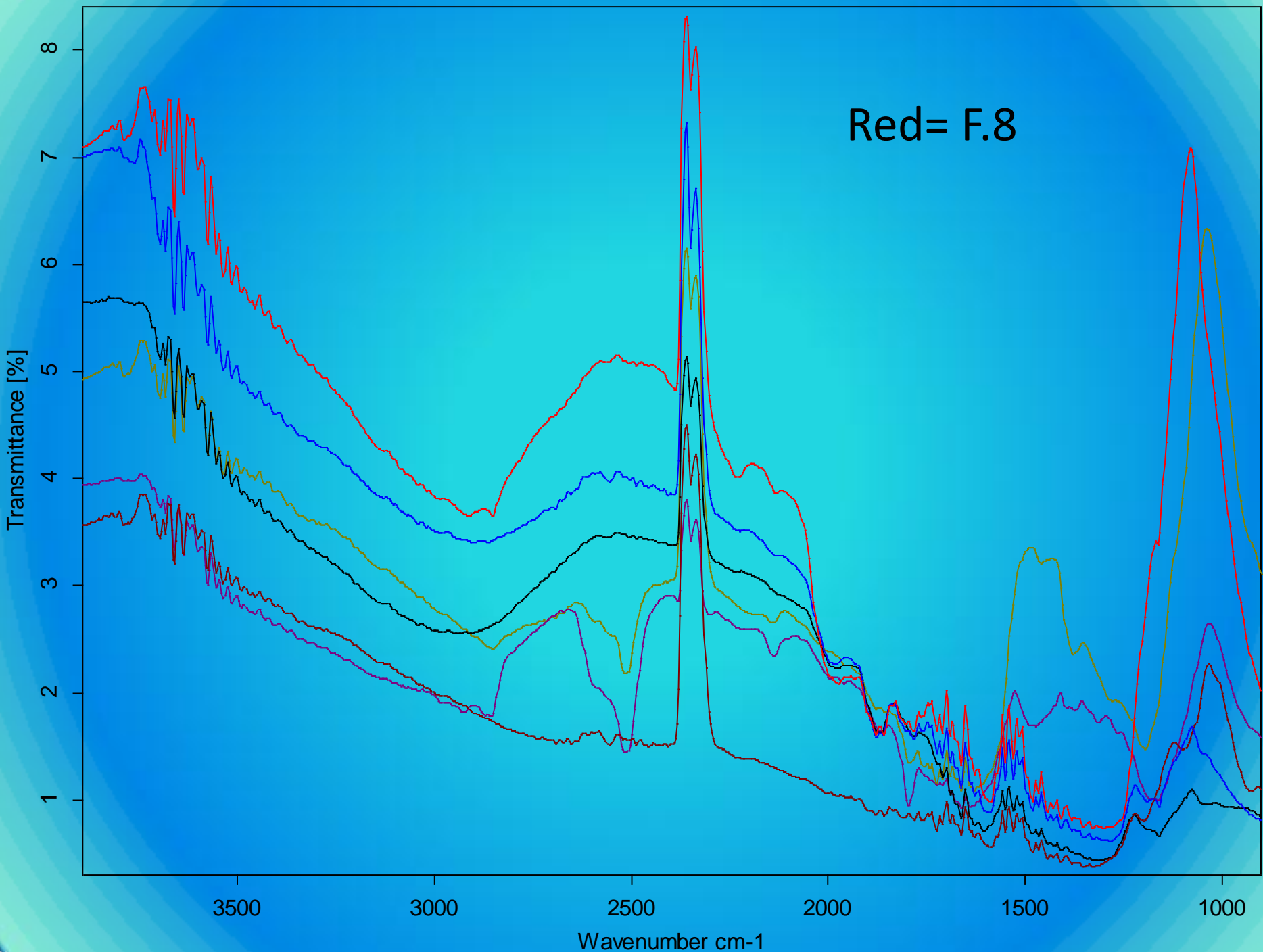
Red= C.13
Black= E.4
Blue= D.3



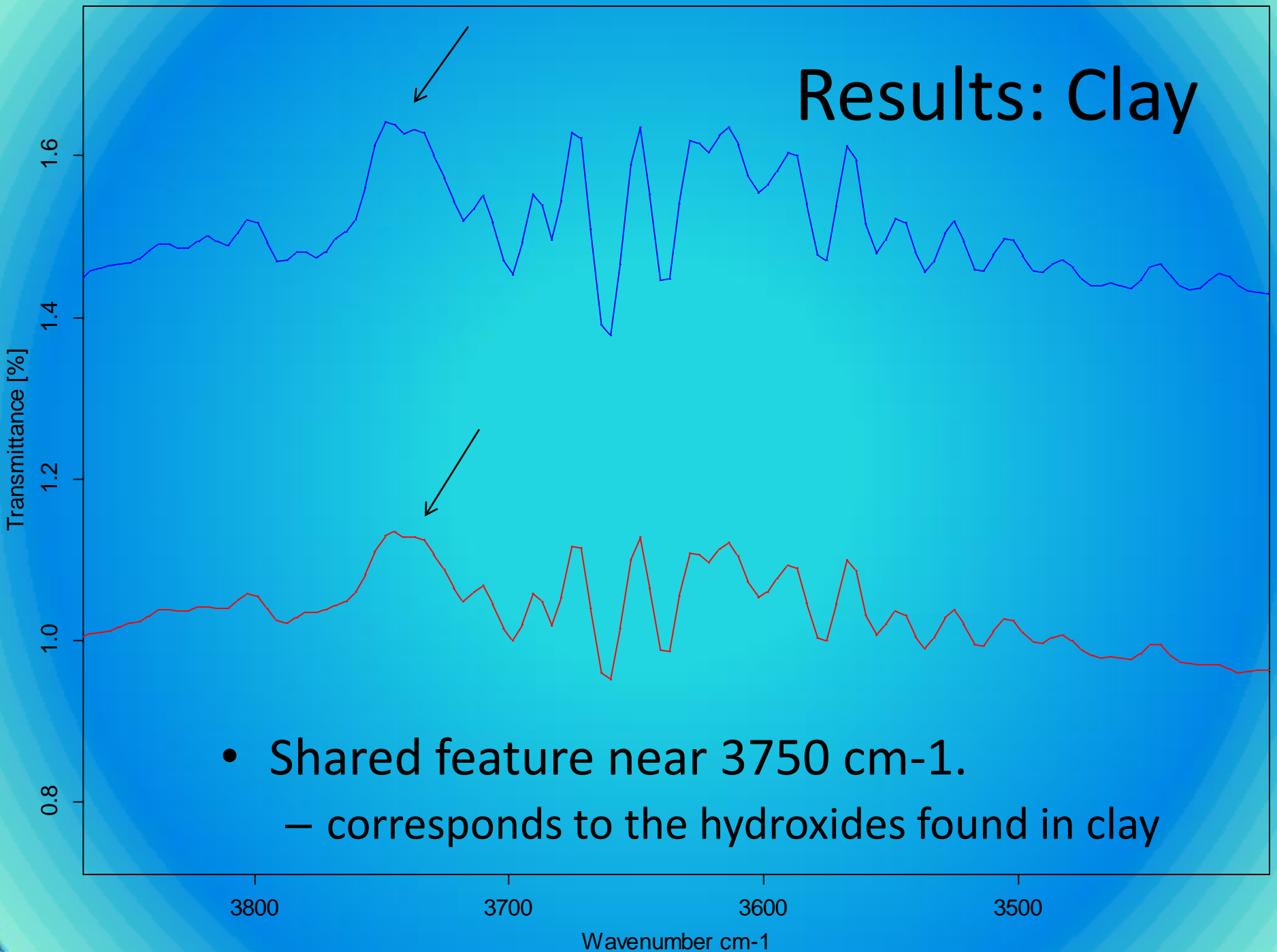


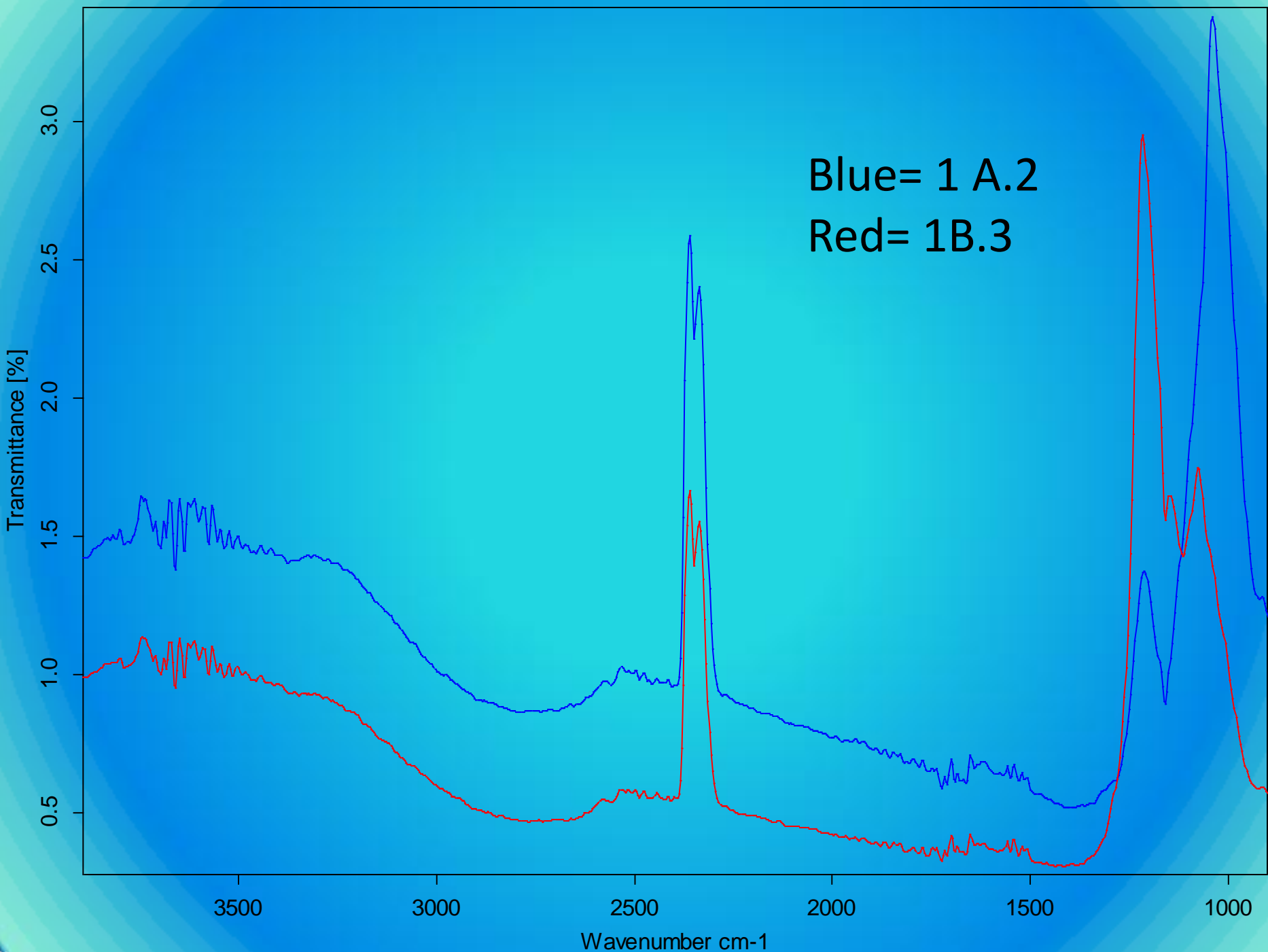


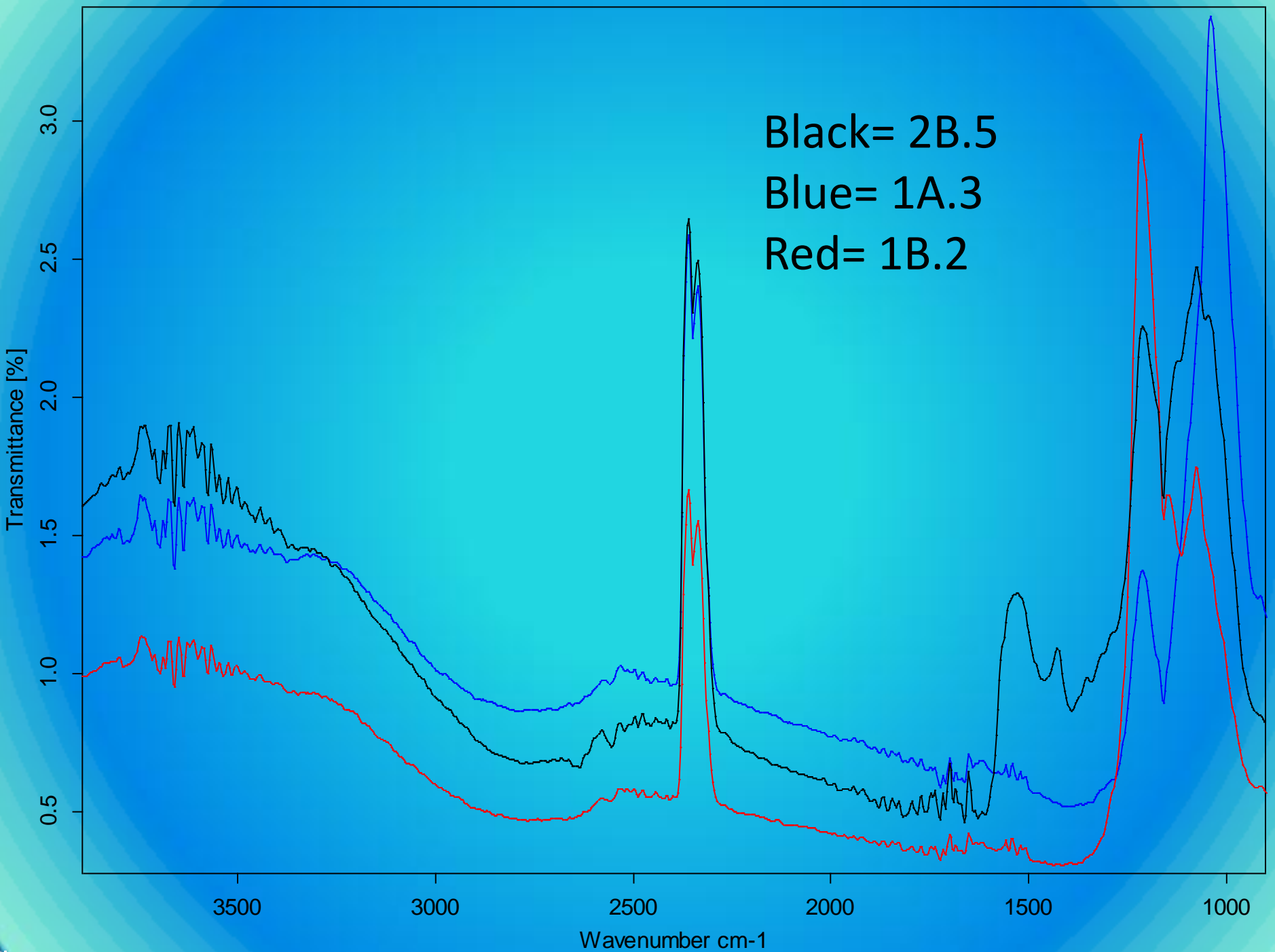


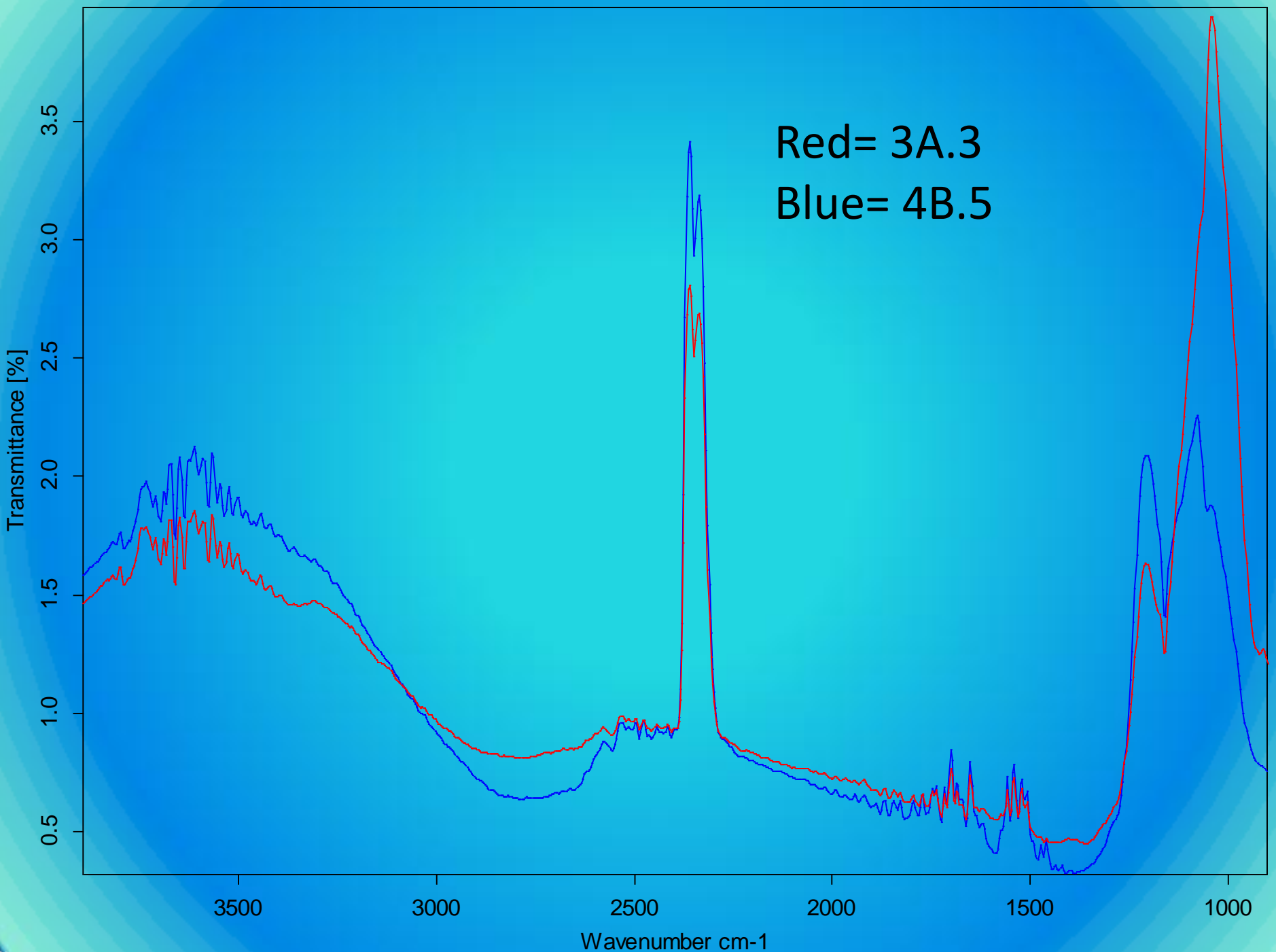


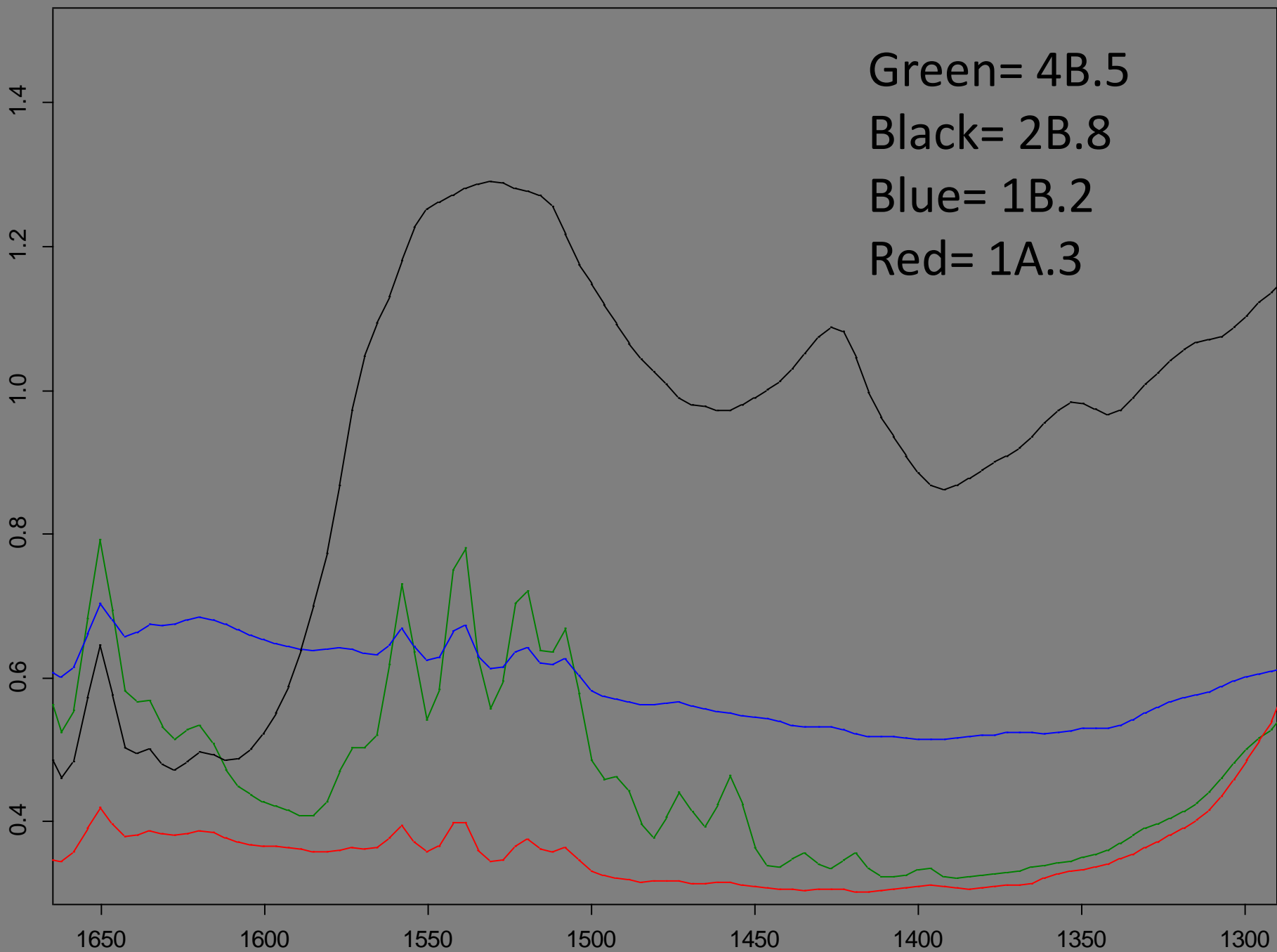
Results: Clay











Importance

- Quick, non-destructive
- Organic residue
- Preservation and conservation uses
 - Oils, dirt, dust
- Interdisciplinary
 - Library of minerals, dyes, etc.
- Limited literature
 - Textiles
 - Slips, glaze, inclusions, etc.
- Black market

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Thank You