

Energy Response Characteristics of Radiochromic Film at CT Radiation Quality.

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Introduction

Radiochromic Films is
Good Dosimeter !



- ✓ Self develops in real time
- ✓ Near tissue-equivalent
- ✓ High spatial resolution
- ✓ Dynamic range from **mGy to Gy**
- ✓ Energy range from **keV to MeV**
etc.

Purpose

GAFCHROMIC XR-QA2 film (Ashland Inc.)

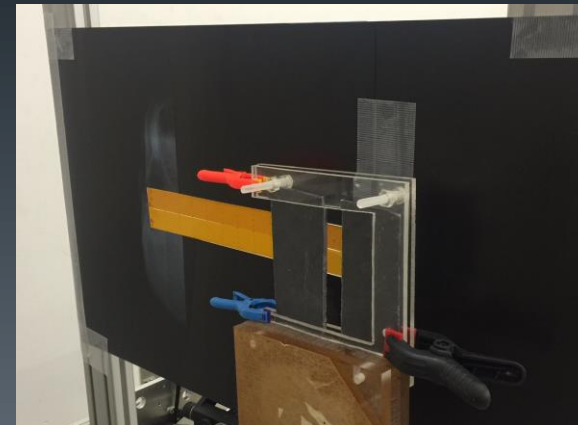


Energy Response

Check !

Materials and Methods

- ◆ Industrial X-ray System: Titan (GE)
 - Tube Voltage: 10—150 kVp
 - Dose Range: 1.0—120 mGy (Air-kerma)
12 steps test
- ◆ GAFCHROMIC XR-QA2 Film (Lot #: 10261501)
 - Film Size: 2.0 cm × 25.4 cm



Materials and Methods

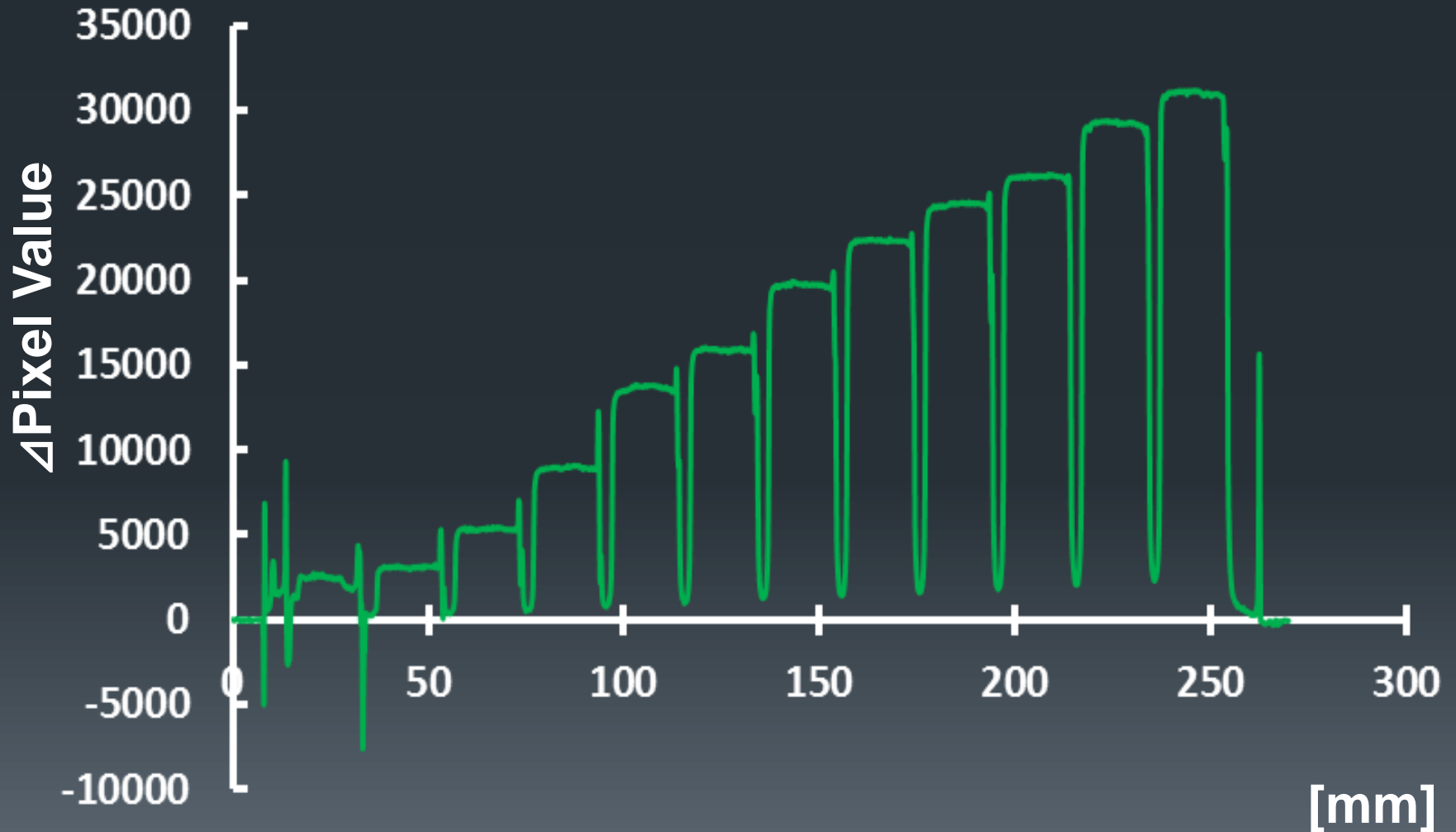
- ◆ Scanner: EPSON ES-G11000
 - RGB (48 bit)
 - 150 dpi
 - Scan Time: pre-exposure, 24 h post-exposure
- ◆ Image Date Analysis
 - Adobe Photoshop CS6 extend
 - Image J 64

$$\Delta \text{Pixel Value [PV]} = \text{PV}_{\text{post}} - \text{PV}_{\text{pre}}$$

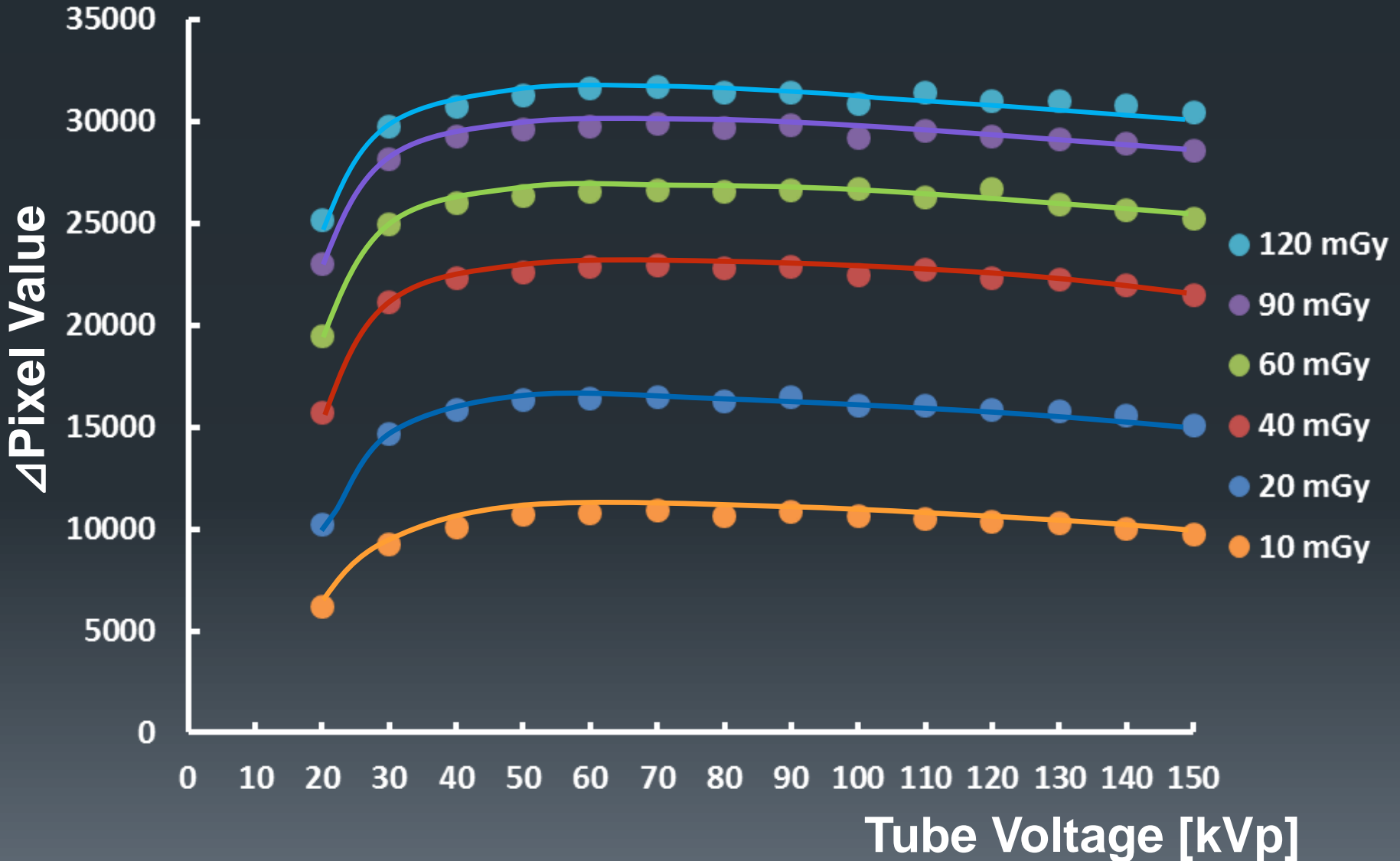


ROI: 60 × 1600 pixels

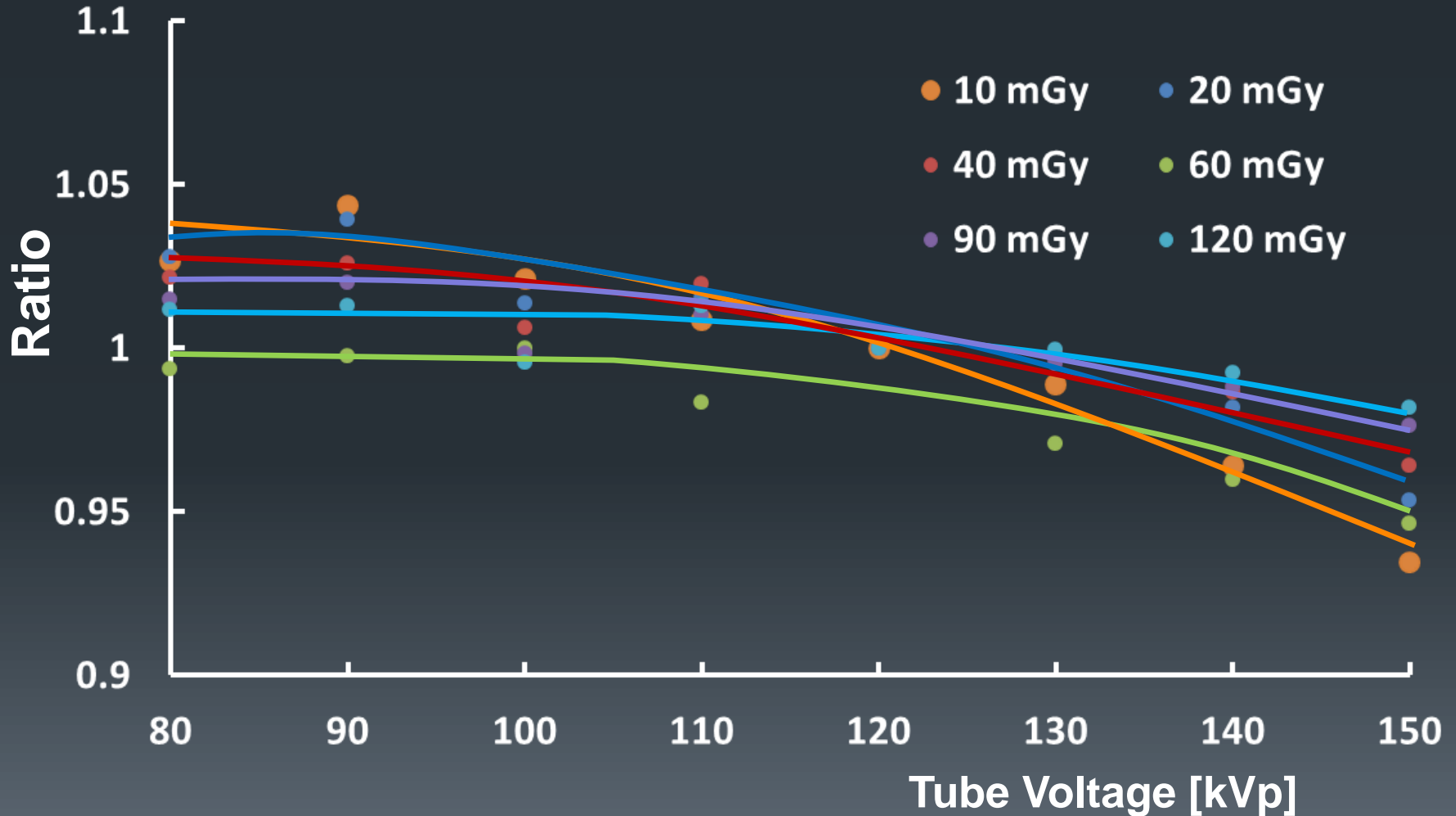
Results: Image date of 120 kV_p



Results: Energy Response



Results: Energy Response Coefficient



Conclusion

➤ Calibration curve

The calibration curve varied according to the tube voltage.

➤ Energy Response

The energy responses were decreased according to increase tube voltage within the range of 50-150 kVp. Additionally, energy responses were decreased rapidly below 40 kVp.

Conclusion



To obtain an accurate measurement of CT dose, calibration curve has to be based on used energy.