

Remotely Interrogated Passive Polarizing Dosimeter

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Problem

PROJECT GOAL

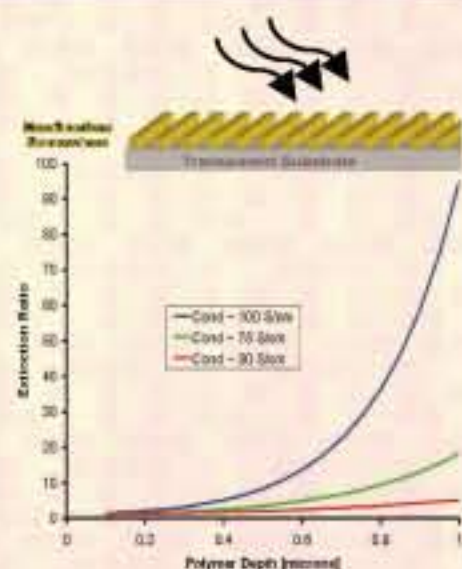
Develop a device capable of measuring ionizing radiation dose while being remotely interrogated

MOTIVATION

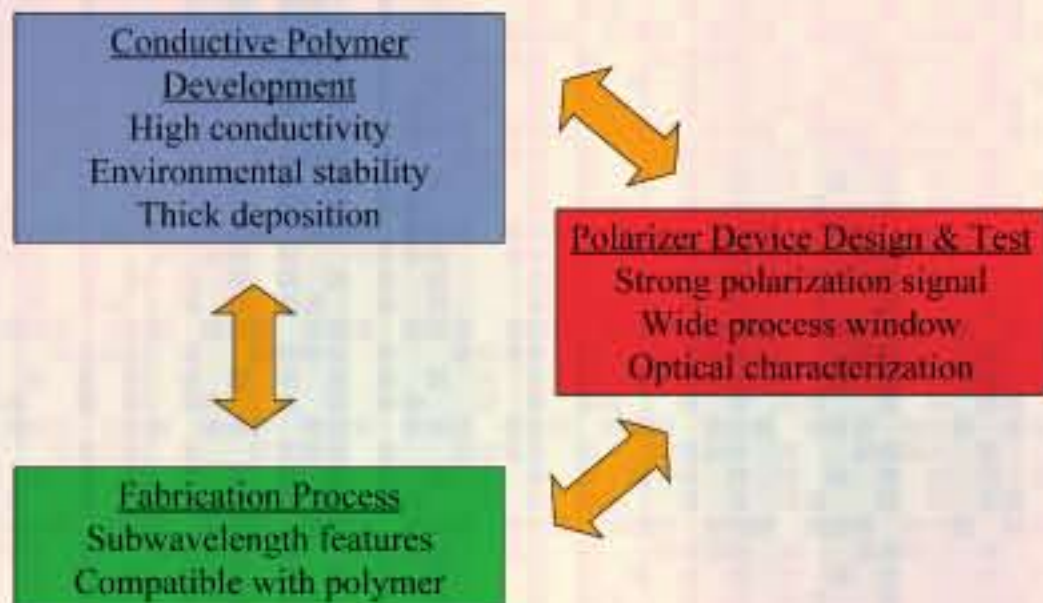
- Safe stand-off from dangerous environment
- Passive monitor not requiring external power
- Innocuous device to avoid alerting others

Approach

- Use a conductive polymer-based IR polarizer
- Conductivity of material changes with absorbed dose
- Conductivity directly relates to extinction ratio of polarizer
- Interrogate polarizer actively (laser) or passively (polarimetric imaging)



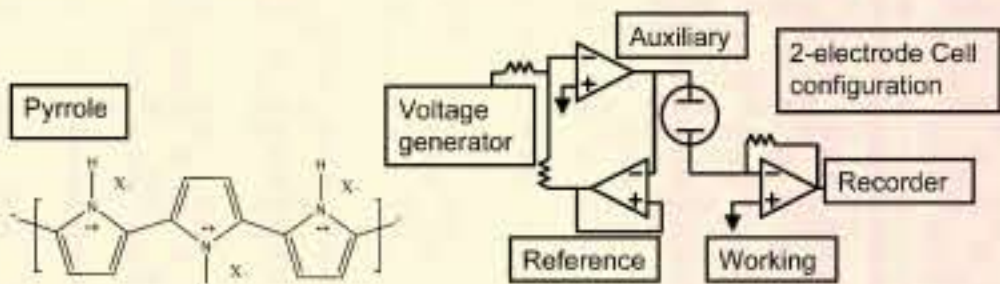
Interdisciplinary Research



Results

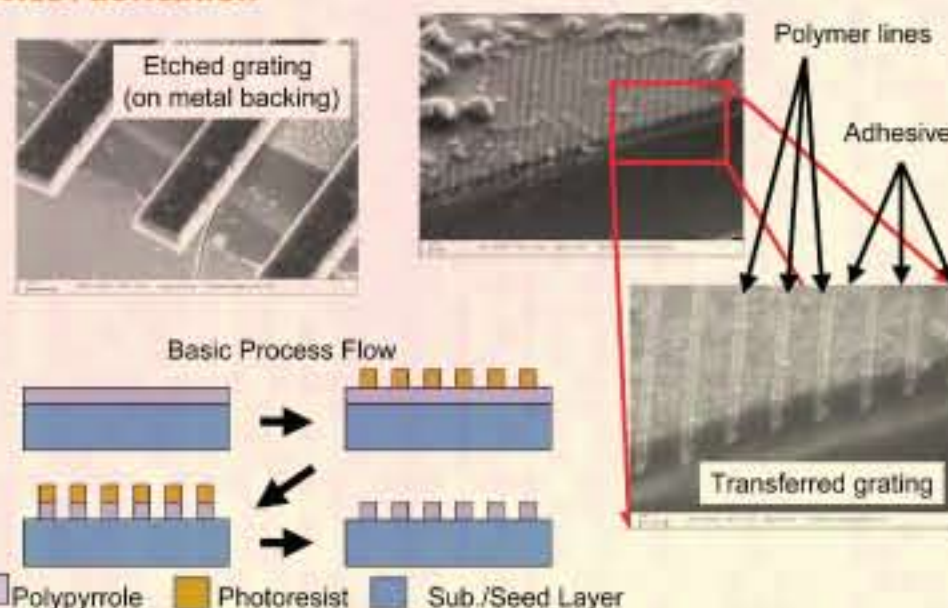
Conductive Polymer Development

- Polymer film grown in two-electrode electrochemical cell using current control
 - Films up to 2.5 μm successfully deposited
 - Conductivities ranged from 10 - 100 S/cm
- Underpotential deposition of silver used to roughen surface and enhance film adhesion
- Films were not adversely affected by acetone rinse or photoresist developer



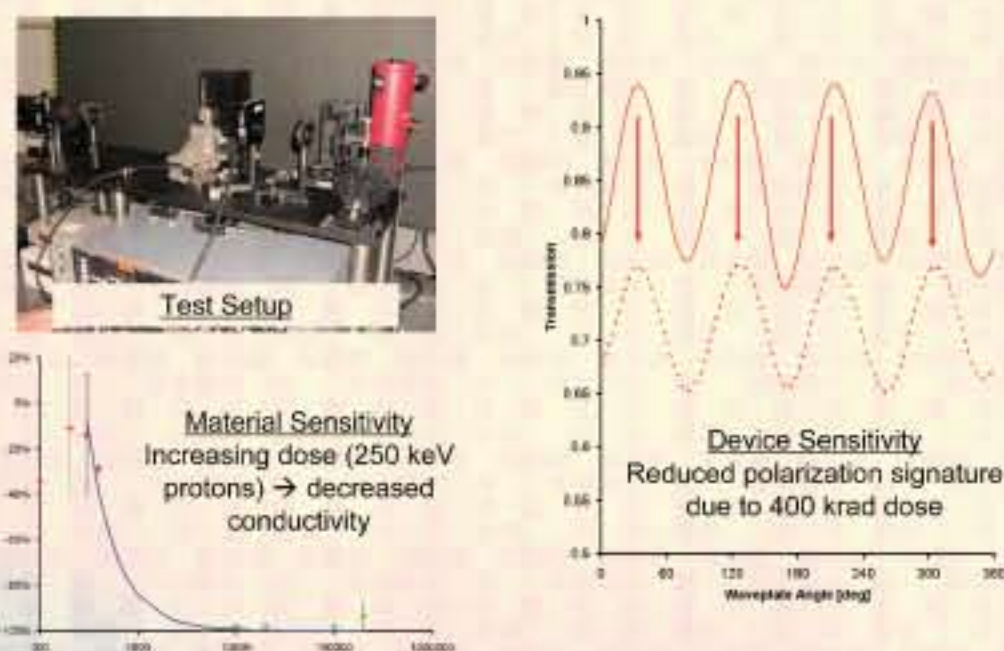
Results

Device Fabrication



Results

Radiation Sensitivity

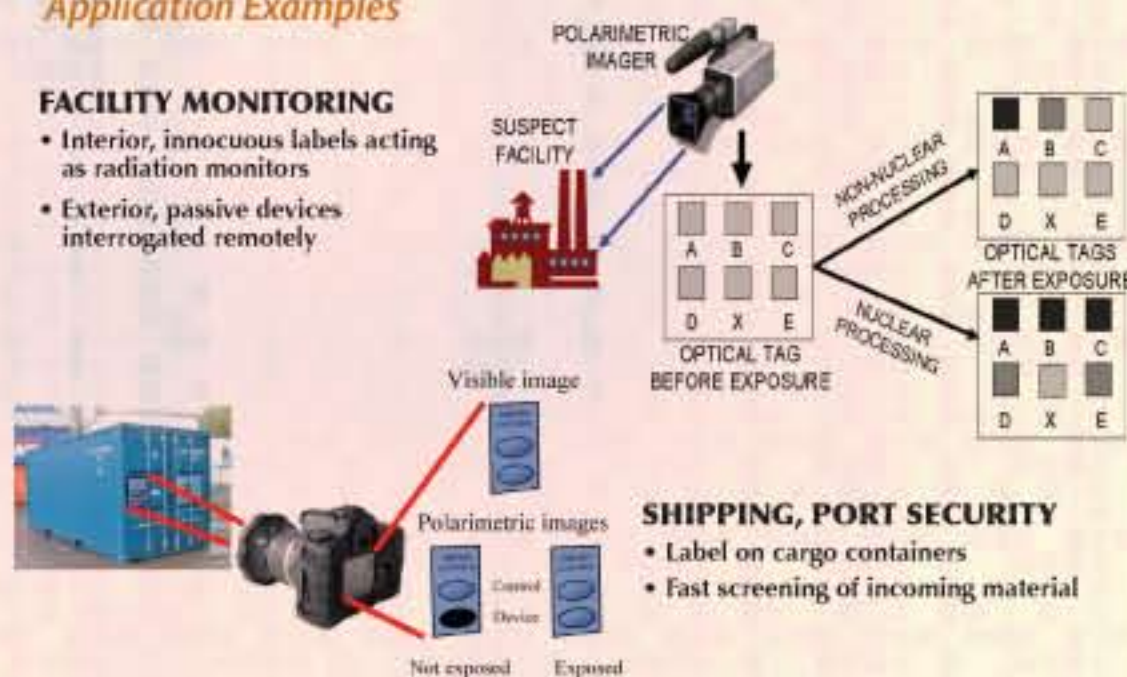


Impact

Application Examples

FACILITY MONITORING

- Interior, innocuous labels acting as radiation monitors
- Exterior, passive devices interrogated remotely



ANTI-TAMPERING LABELS VEHICLE TAGS

- #### SHIPPING, PORT SECURITY
- Label on cargo containers
 - Fast screening of incoming material