

# Mature Technology New Features

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## Mature Technology, New Features

- History of the Bank of Canada's R&D program and its "Optical Security Material" (OSM).
- New security feature developments and production and quality improvements.
- Moving this mature technology away from conventional colour-shift into new areas with greater potential.

**This journey has only just begun!**

## First, why does the Bank of Canada do R&D?

- Our mandate is confidence in bank notes.
  - R&D strategy motivated by counterfeiting crisis 2001-2004.
- Part of our strategy is to keep ahead of counterfeiters.
- If the bank note industry produces leading edge security features, we will buy them.
- If the industry doesn't address the gap, we will do R&D (with partners if possible) on ideas to fill the gap.

## What the Bank brings to R&D

- We know counterfeiters and their work.
  - We see all the counterfeits and analyse the technology counterfeiters use.
- We know counterfeiting techniques.
  - We try to simulate any feature we're considering.
- We have experience using some security technologies over several series.
  - One technology (thin film) we even manufacture ourselves.

## Our long history with Optical Thin Film

- Original threat: colour copiers.
- Solution: sharp, bright colour-shift produced by vacuum deposited thin film.
- Developed with the National Research Council of Canada in the early 1980s.
- Manufactured in the Bank's own roll-coating facility
- First used as a colour-shifting patch on \$20, \$50, \$100 and \$1,000 denominations of Birds of Canada series issued 1988-93.

**Tilt the note to see patch shift from gold to green**



## Thread: Second Generation Optical Thin Film

- Thin film colour-shift on windowed thread.
  - Used on all Canadian Journey denominations issued 2004-06.
  - Other colour pairs made available to currency issuers commercially through De La Rue Security Threads.

## Dashes shift from gold to green





## Mature Technology in Manufacturing

- Ottawa manufacturing staff have built up valuable know-how around production techniques and thin film construction over 20 years of production.
- Quality control procedures in place, ISO certified, and overarching quality assurance standards.
- Continuous improvement in efficiency and product quality.

## Mature Technology in Use

- Used on nine denominations of Canadian notes over two series of bank notes.
- Also supplied material for use on bank notes and other security documents in a number of countries.
- Thin film material is an easily recognized feature with an excellent track record for security and durability.

**Where to take this mature technology next?**

## Improving the Technology

- From 2007, improvement program focused on:
  - Thin film as a security platform:
    - Survey of emerging and existing threats.
    - Analysis of the ability of available security features to address these threats.
    - Identification of the gaps.
  - Manufacturing productivity:
    - Technological improvements in the basic thin film stack structure.

## Results of the Improvement Program to Date

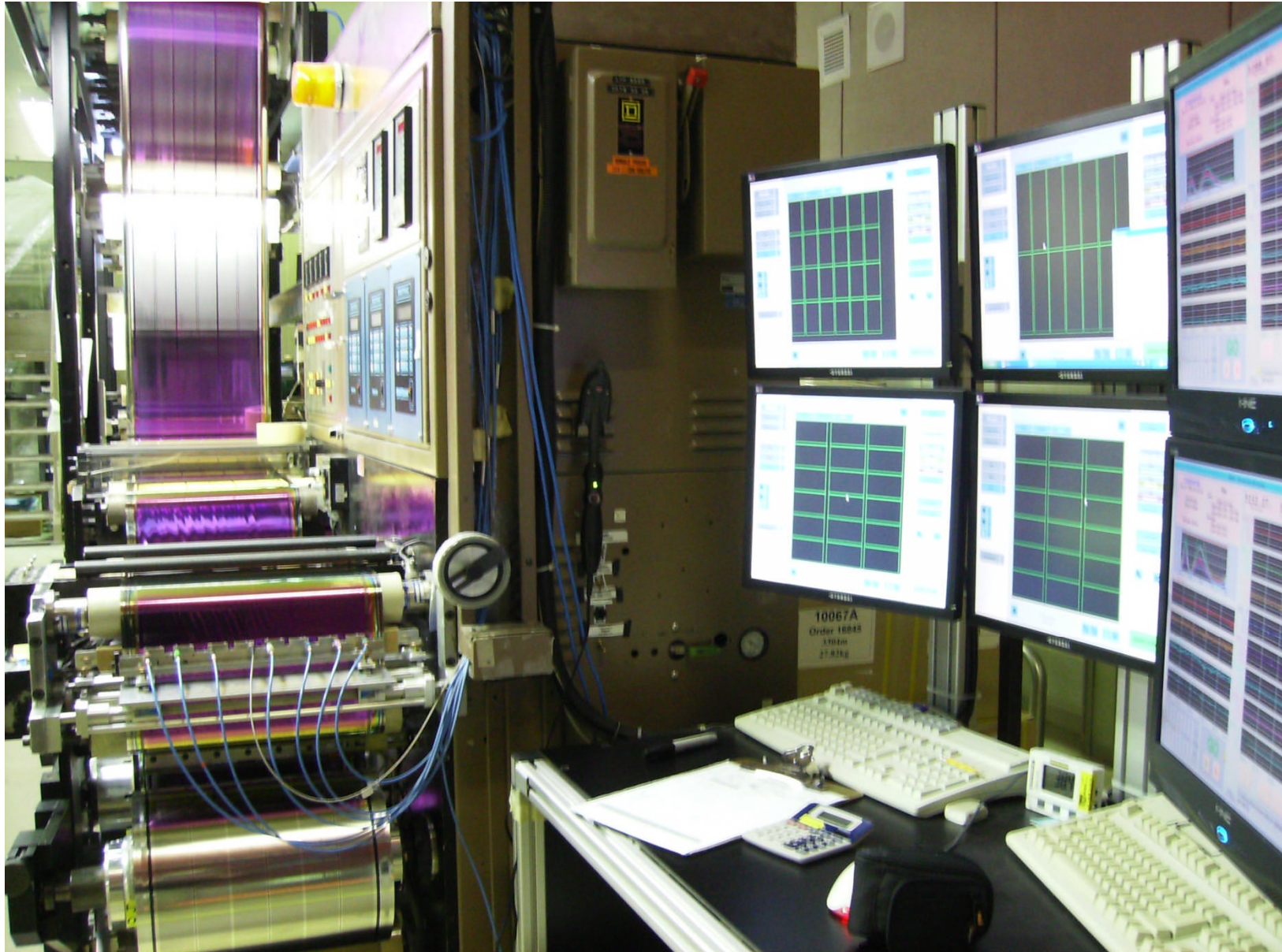
- Efficiency: Improving productivity
- Security: Improving the colour-shift capability
- Security: Broadening the OSM platform beyond colour-shift

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## Efficiency: Improving Productivity

- Production cost reductions
  - Equipment enhancements
  - **Process improvements**
  - **Production cycle time improvements**
  - Integrated Management System (ISO:9001, ISO:14001, OHSAS:18001)
  - Production related R&D
- Quality Assurance
  - Automated machine inspection system.
  - Closer client relationship management.





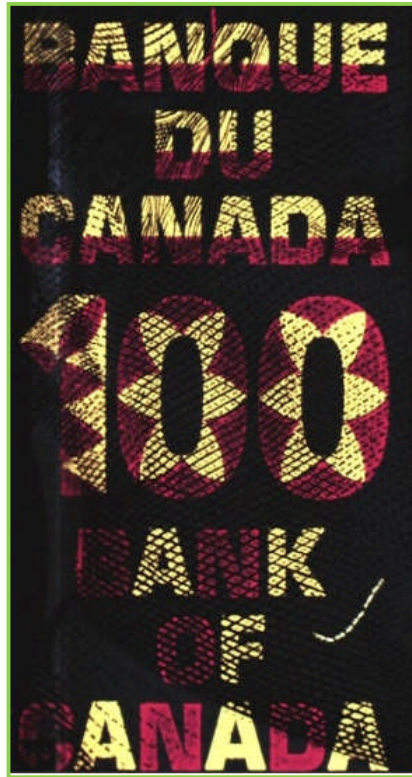
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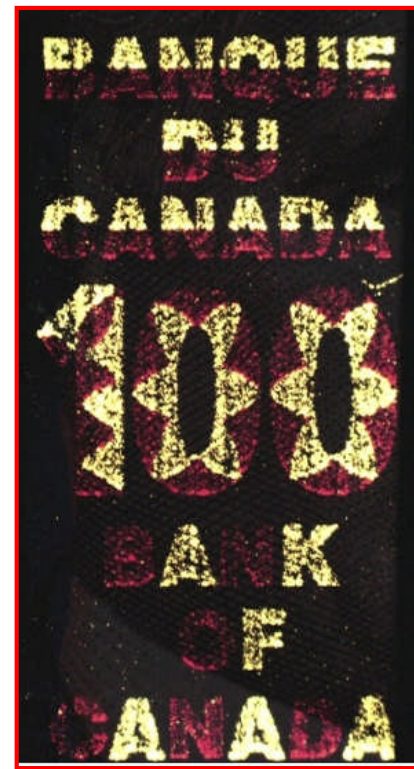
## Security Gap: printed UV feature compromised

- Availability of inkjet printable fluorescent inks poses a significant threat to the printed UV fluorescent feature in Canadian bank notes.



Genuine

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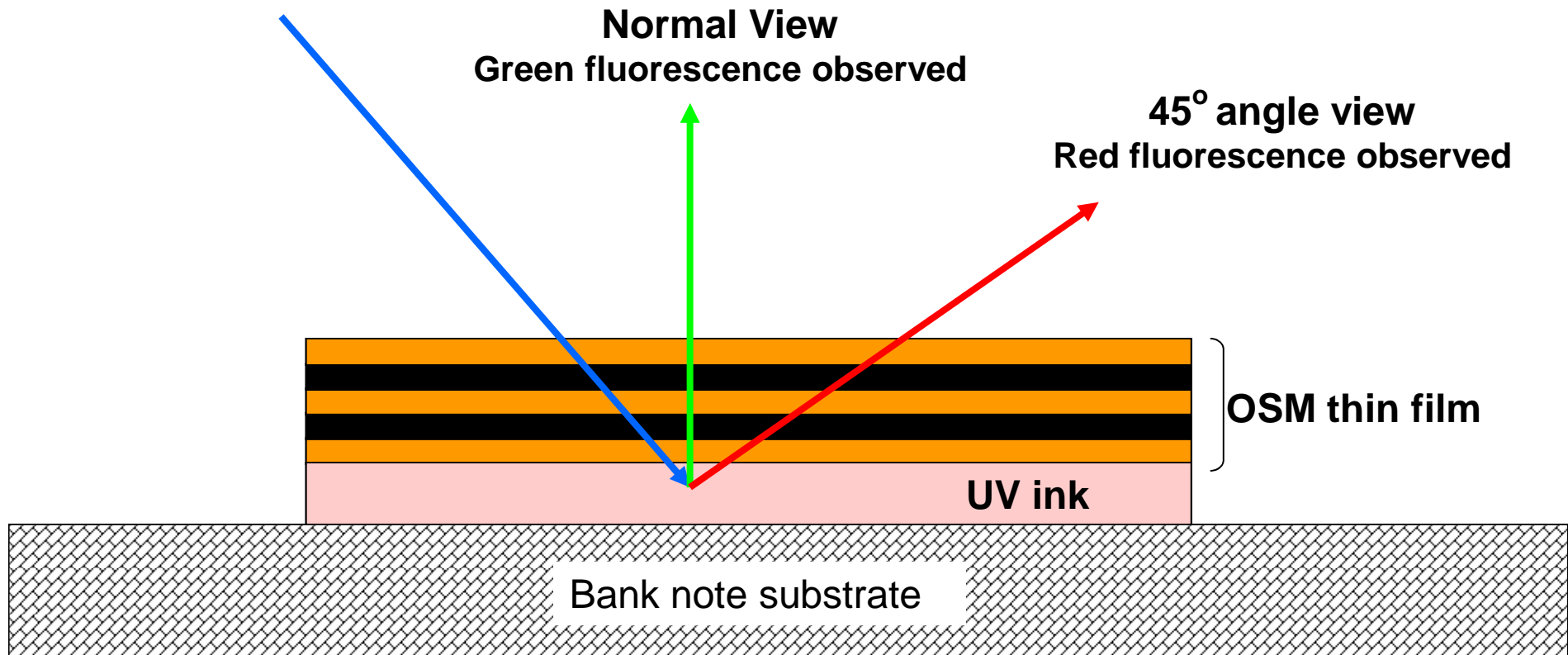


Inkjet counterfeit

## Possible solution using thin film: FluorOSMent

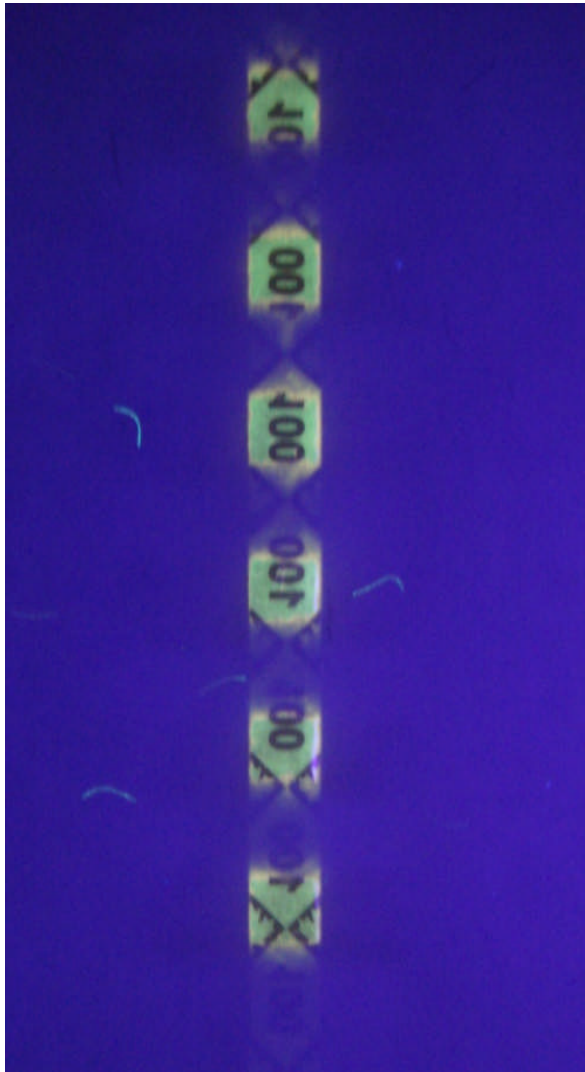
- Produces a colour-shifting effect in fluorescent, transmissive and ambient modes as well as infrared.

UV light source (365 nm)



# Fluorescent

Normal

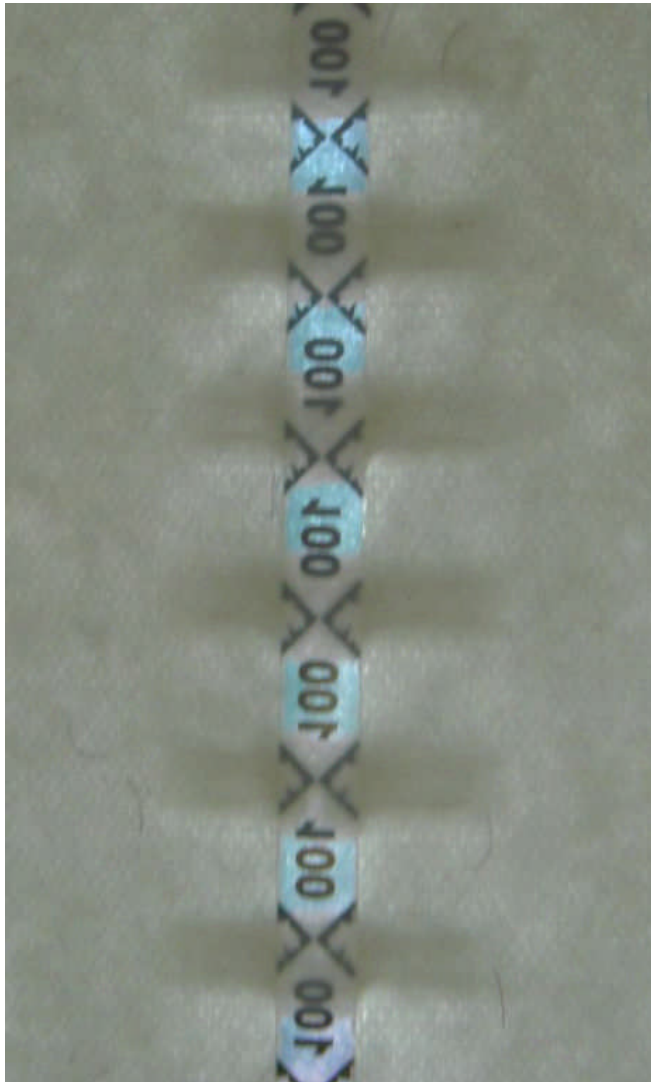


Embedded Thread Design  
45 Degree Angle

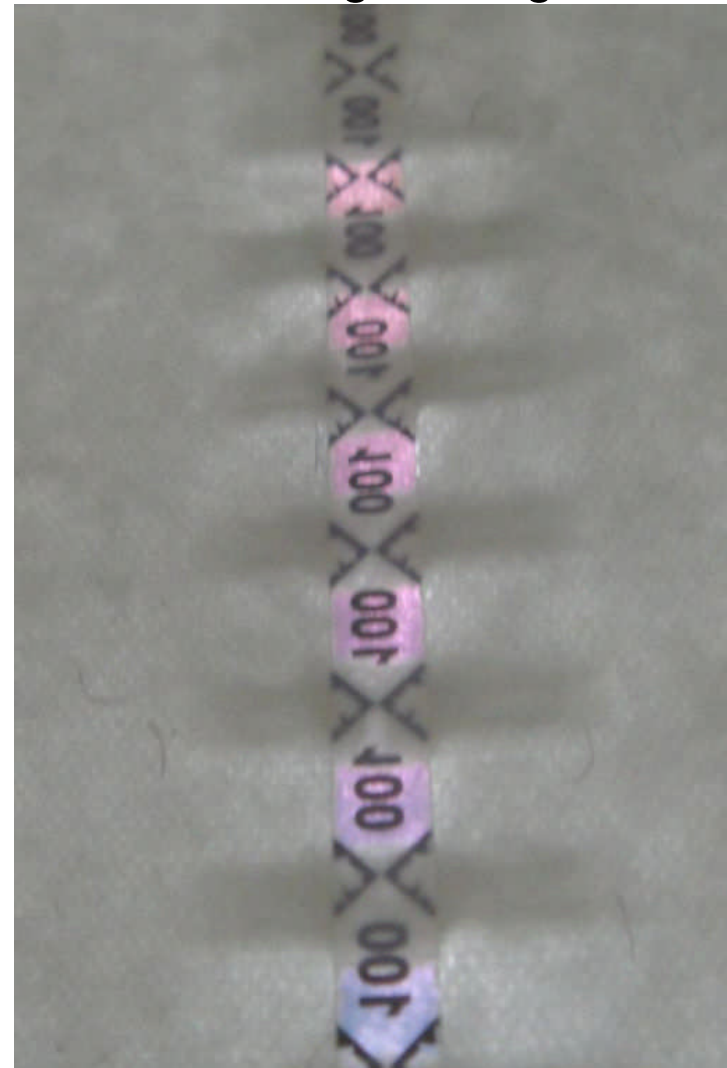


# Transmissive

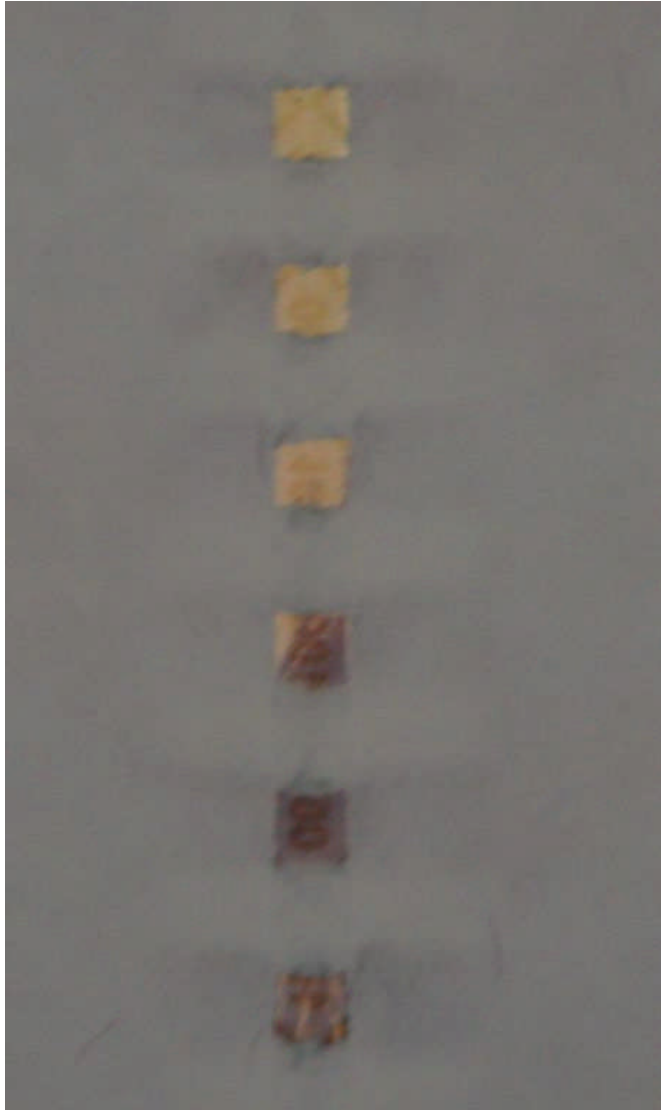
Normal



45 Degree Angle

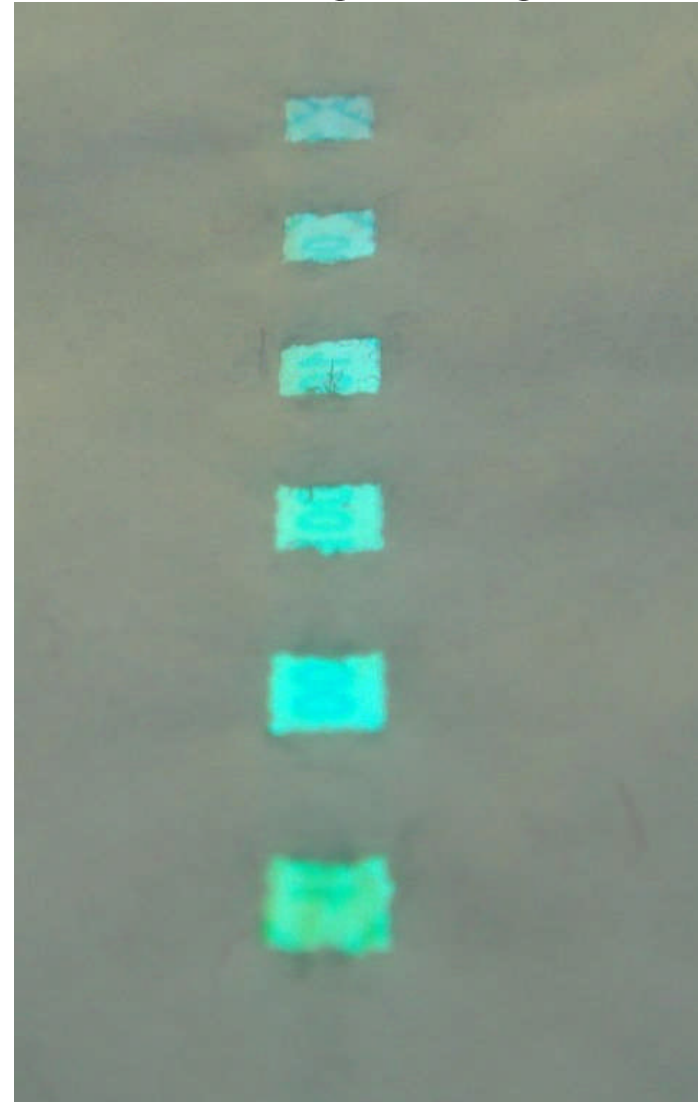


Normal



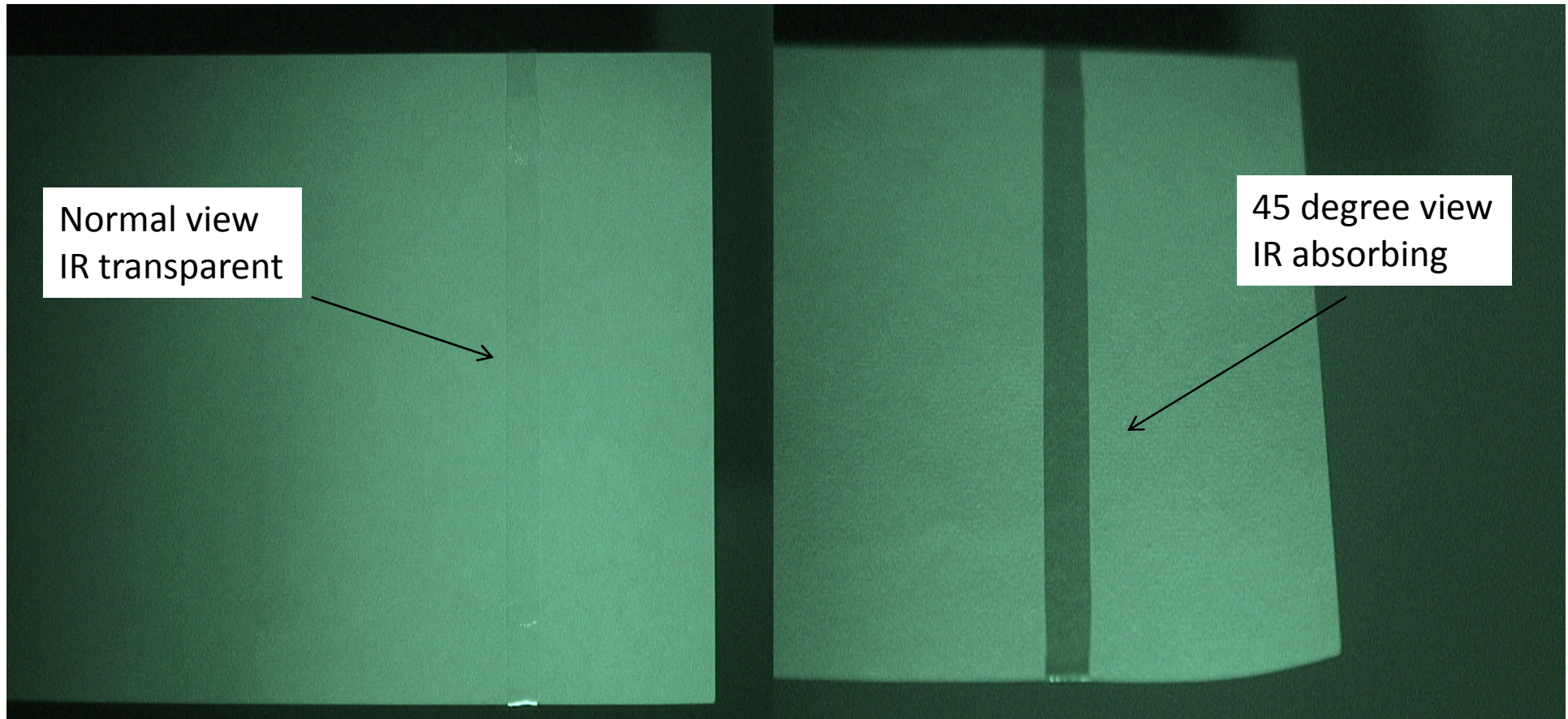
Ambient

45 Degree Angle



# InfraRed

## IR Photographs of a FluorOSMent Foil Stripe



The FluorOSMent thin film transitions from being transparent in the IR at normal view to IR absorbing when viewed on angle.

So we got this “mature” technology to offer:

- UV colour shift
- Transmissive colour shift
- Ambient light colour shift
- IR transparent/absorbing shift
  - ...all in one device





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## Moving the Technology into Growth Areas

- Over the last 12 months the R&D emphasis has shifted.
- Now targeting developments which move the OSM thin film technology beyond conventional colour-shift technology.
- To date, patents lodged covering three concepts which fall into both the “human assisted” and “human unassisted” categories.
- Other related concepts being developed.

**Great potential for the thin film technology as a platform for new security features.**

## We are pleased with our R&D results, but we can't succeed alone

- All our successful R&D projects have involved commercial partners.
  - Applying the same principle to our thin film technology program.
- We and our partners have a common objective: bank notes the world can use with confidence.



BANK OF CANADA  
BANQUE DU CANADA

CELEBRATING 75 YEARS  
CÉLÉBRONS 75 ANS

# Research and Development can breathe new life into mature technology

## Thank you





# Questions?

