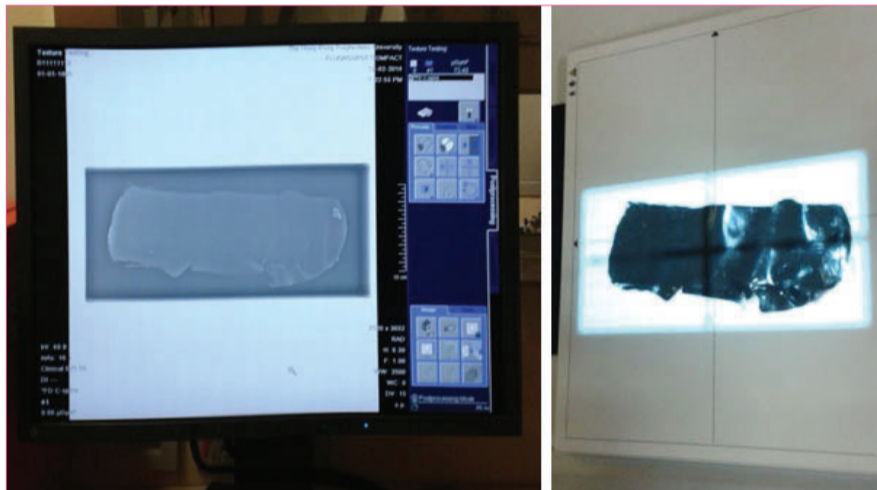


# 高能量射線遮罩織物的新技術

## Novel Technology of Shielding Textiles against High Energy Rays

安全、具彈性及可回收重用的X光防護產品  
Safe, flexible and recoverable X-ray protective products

這項技術採用新穎環保物料鎢/聚氨酯(WPU)合成物，利用常規的熔融紡絲及熔噴織造設備，製造安全可靠的高能量射線遮罩纖維、簾布及防護服等產品。與笨重的傳統含鉛橡膠防護服相比，新的防護服較為柔軟、輕巧，且具更佳的彈性和防護效果，因此可望取代傳統防護服，為需要經常接觸X光及其他高能量射線的人士提供更周全的保護。此外，新技術無需使用溶劑，並且可回收再生，循環使用，非常環保。



WPU-簾布的疵點檢查  
Fault check of WPU- curtain by imaging



數位式X-射線透視儀  
Digital X-ray scanner

X光防禦服  
Protective garment against X-ray

This technology uses a novel green material, elastic polyurethane/tungsten (WPU) composite, to manufacture safe and reliable fibres, curtains and protective garments for shielding high energy rays. Manufactured with common equipment for melt spinning and melt blowing, the new protective uniforms are lighter in weight, softer, more flexible, and more efficient in radiation shielding than conventional rubber uniforms containing lead particles, which are heavy and bulky. The new uniforms are expected to replace conventional uniforms, and bring great benefits to users of X-ray and other high energy producing facilities. In addition, this green technology does not involve the usage of solvents, and the material is recoverable for recycling.

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專利申請編號及國家: CN103556308A (中國), CN103603089A (中國)

### 特色與優點

- 以無毒、非活性的鎢取代有毒的鉛
- 比傳統橡膠防護衣更安全、環保、柔軟舒適及具彈性
- 可回收再生，循環使用

### 應用

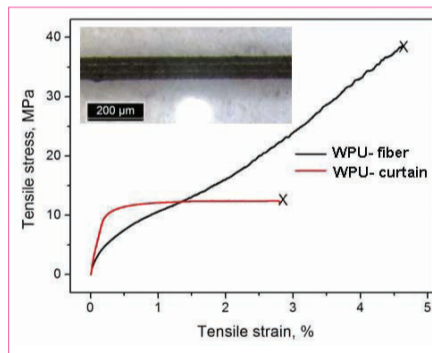
- 防護背心、圍裙及配件，適用於設有X光及放射性儀器的場所，如醫院、診所和化驗所等
- 機場安檢及核電站等設施的便攜式X光屏蔽簾布

### 獎項

加拿大國際發明創新比賽2016 - 銀獎 (2016年8月)

	X-ray dose on receiver ( $\mu\text{Gy}$ )	Shielding (%)	Thickness (mm)	LAC ( $\text{mm}^{-1}$ )	Density ( $\text{g}/\text{cm}^3$ )
Blank	117.9	-			
Traditional lead rubber (0.25mmPb)	11.4	90.3	1.02	2.29	4.09
WPU curtain	7.7	93.5	0.85	3.21	3.81

X-射線遮蔽測試 (100千伏, 2.0毫安培) (LAC- 線性衰減係數)  
X-ray shielding test (100 kV, 2.0 mAs) (LAC - linear attenuation coefficient)



WPU-纖維及簾布的拉伸強度 (附纖維照片)  
Tensile strength of WPU- fiber and curtain (inset: photo of fiber)

Patent Application No. and Country: CN103556308A (China) and CN103603089A (China)

### Special Features and Advantages

- Replacing toxic lead with non-toxic and non-reactive tungsten
- Safer, greener, softer and more flexible than conventional lead-containing rubber protection garments
- Recoverable and recyclable

### Applications

- Protective vests, aprons and accessories used in establishments where X-ray and radioactive equipment is operated, e.g. hospitals, clinics and laboratories
- Portable X-ray shielding curtains, e.g. airport security channels and nuclear power stations

### Award

Silver Medal, iCAN 2016 International Invention Innovation Competition in Canada, Canada (Aug 2016)



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