

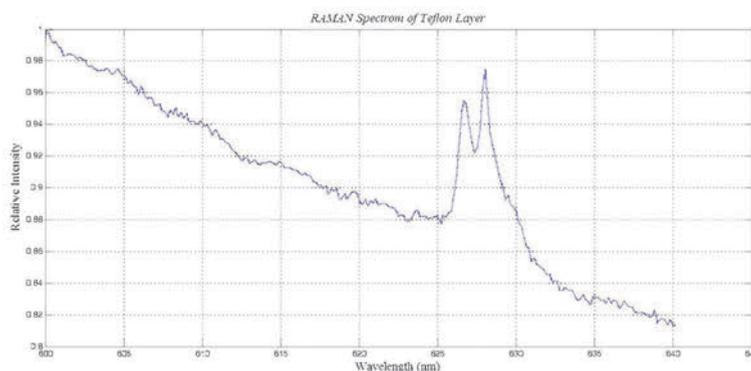
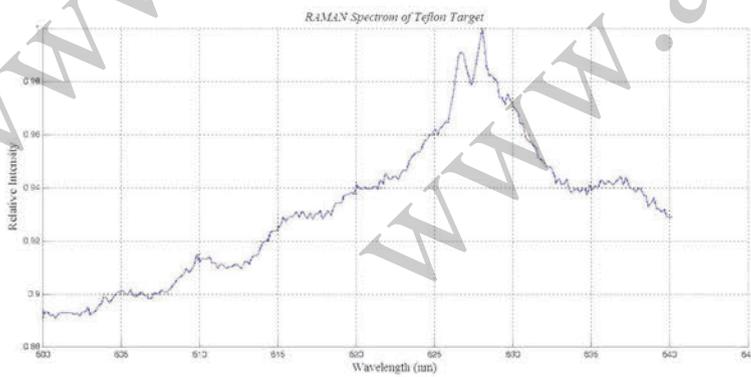
# Pulsed Laser Deposition (PLD)

Pulsed-laser deposition (PLD) is one of the versatile methods of depositing a thin film of a wide range of materials including metals, carbon, and numerous complex systems including complex-oxide heterostructures, superlattices, and well-controlled interfaces.

pulsed laser deposition steps consists of a rapid removal of material from a solid target and formation of an energetic plasma plume, which then condenses onto a substrate. Despite the simplicity of the technique, the Processes of PLD – including ablation, plasma formation, plume propagation, as well as nucleation and growth – are rather complex.

## TEA-CO<sub>2</sub> pulsed laser

Carbon dioxide excitation of transverse electric laser (TE CO<sub>2</sub>) is a pulsed laser capable of increasing the repetition frequency up to 100 Hz. Each Pulsed laser has Energy of 0.1, 2, 30 joules. The length of the beam pulse is 100-200 ns. The maximum power-defined by pulsed energy divided by pulse's length- is around 1-100 MW.



## Application

### Electronics

- Transistors and diode fabrication
- MEMS

### Batteries

- Buffer layers

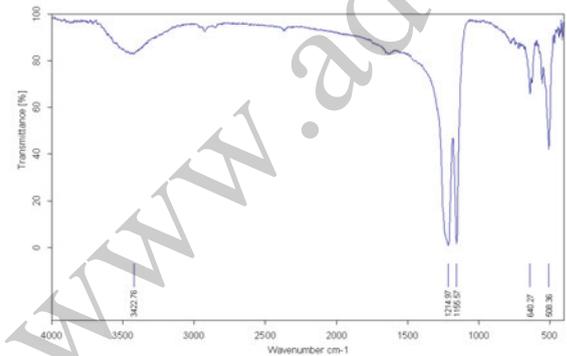
### Tribological applications

- wear parts (cutting tools, machine parts, drills, etc.)

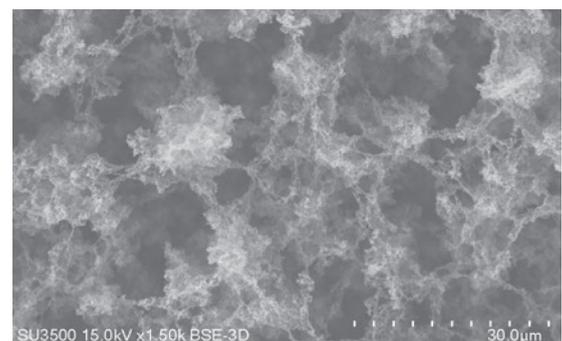
### Sensors

- Chemical sensors fabrication

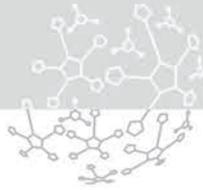
## The layer deposited by pulsed laser deposition system



FTIR spectrum of normalized PTFE layer



SEM image of PTFE layer



**Features:**

- Deposition of all kinds of polymer material
- No need of low vacuum
- High safety
- Capable of beam's control (optional)
- Ability of using Nd:YAG laser for metal deposition (optional)
- Automatic rotation of target for sequential deposition
- The ability of heating the substrate to 100°C
- Adjustment of pressure from  $2 \times 10^{-2}$  mbar to  $10^{-5}$  mbar (optional)
- Ability of purging gas (optional)
- Ability of laser heating (Optional)

**SPECIFICATION**

Laser Power	1 joule per pulse
Pulse Width	100 ns
Power	10 MW per pulse

**Advantages:**

- Deposition under low vacuum
- High rate of deposition
- Very dense layers formation

**SPECIFICATION**

Energy	100 mJ	2 J	30 J
Max Power	1 MW	20 MW	100 MW
Max Repetition Rate	100 Hz	10 Hz	1 Hz
Wave Length	9-11 $\mu$ m		
Profile Size (mm)	10x10	15x15	50x50
Voltage- Current	Single phase 220 V – 10 A		

