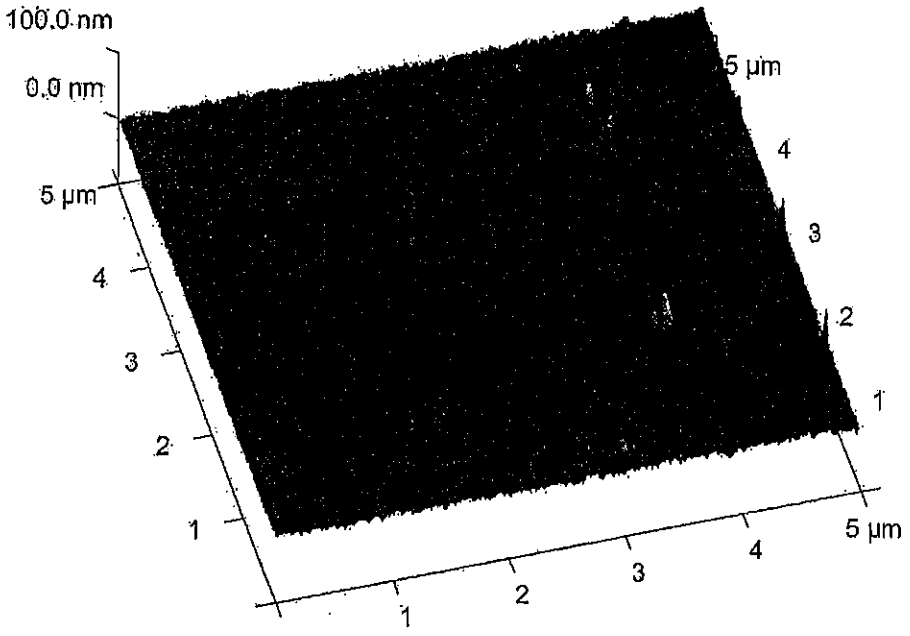
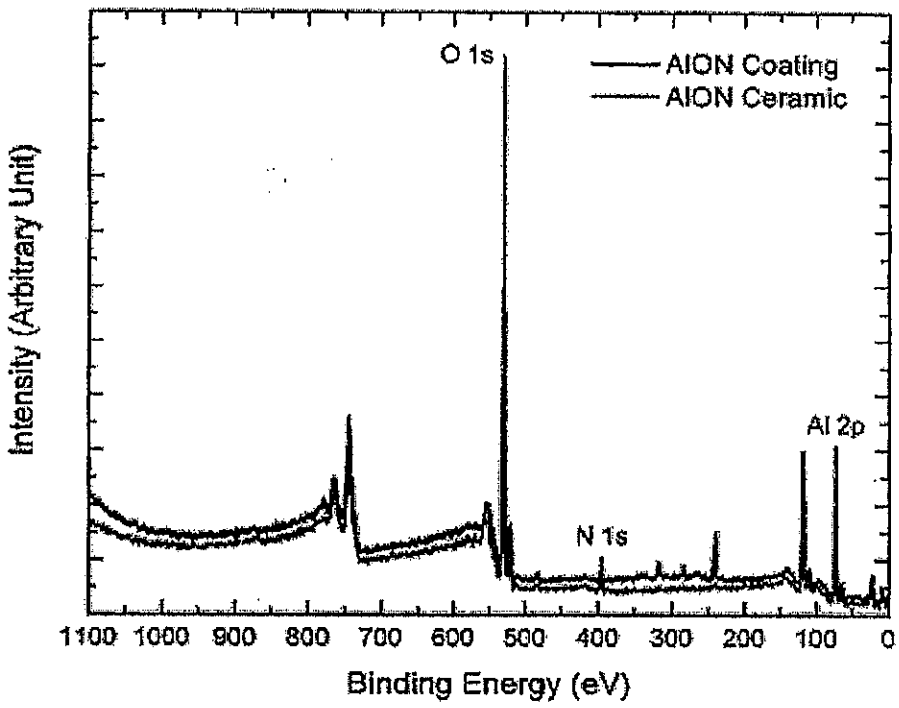
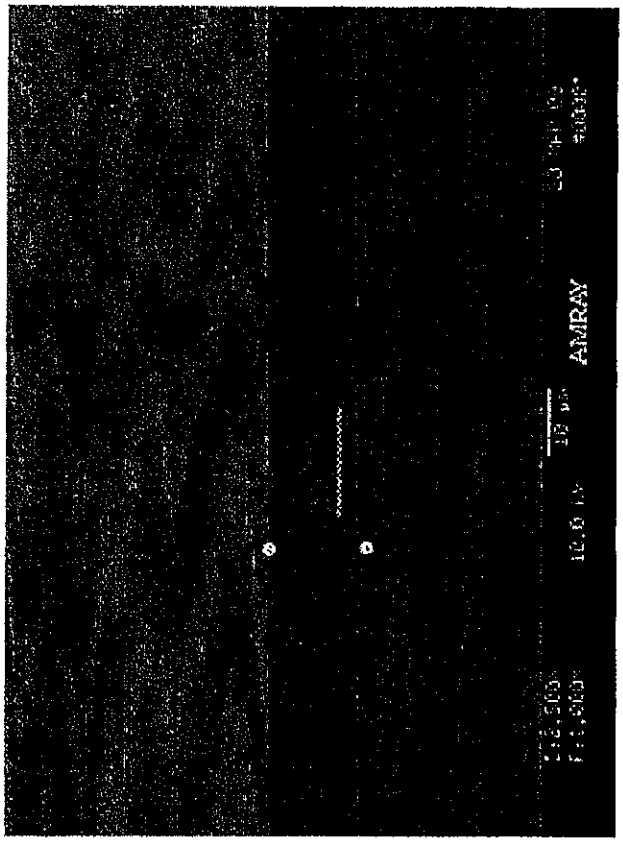


FIG. 1A

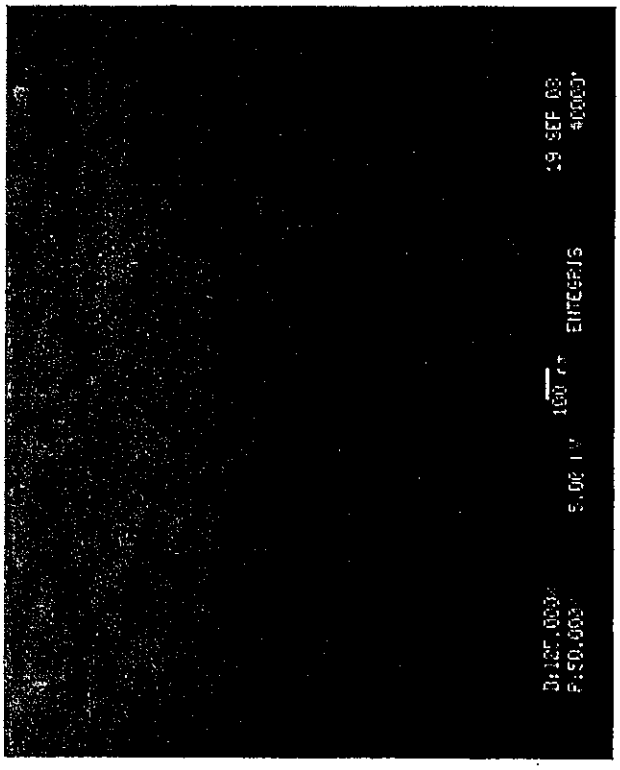


XPS composition survey of AlON coating and ceramic

FIG. 1B

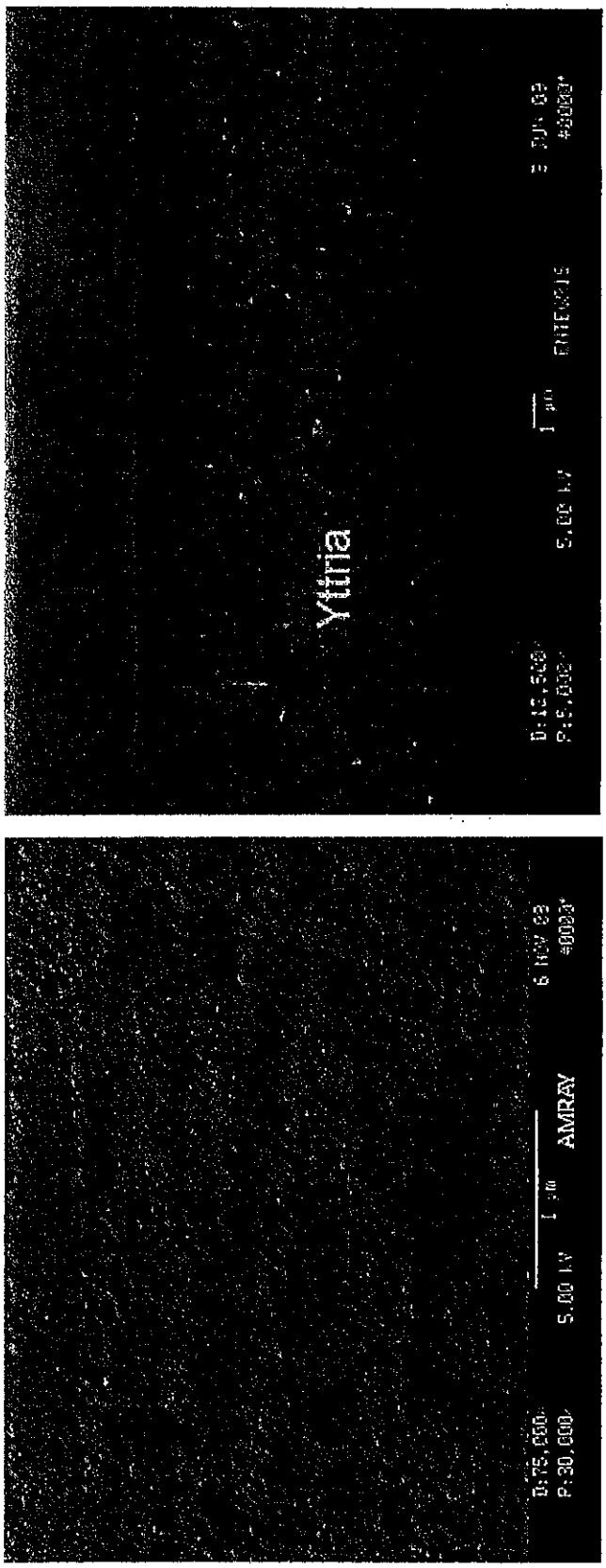


Coating Cross Section



Coating Surface Morphology

FIG. 1C



Coating Cross Section

Coating Surface Morphology

FIG. 1D

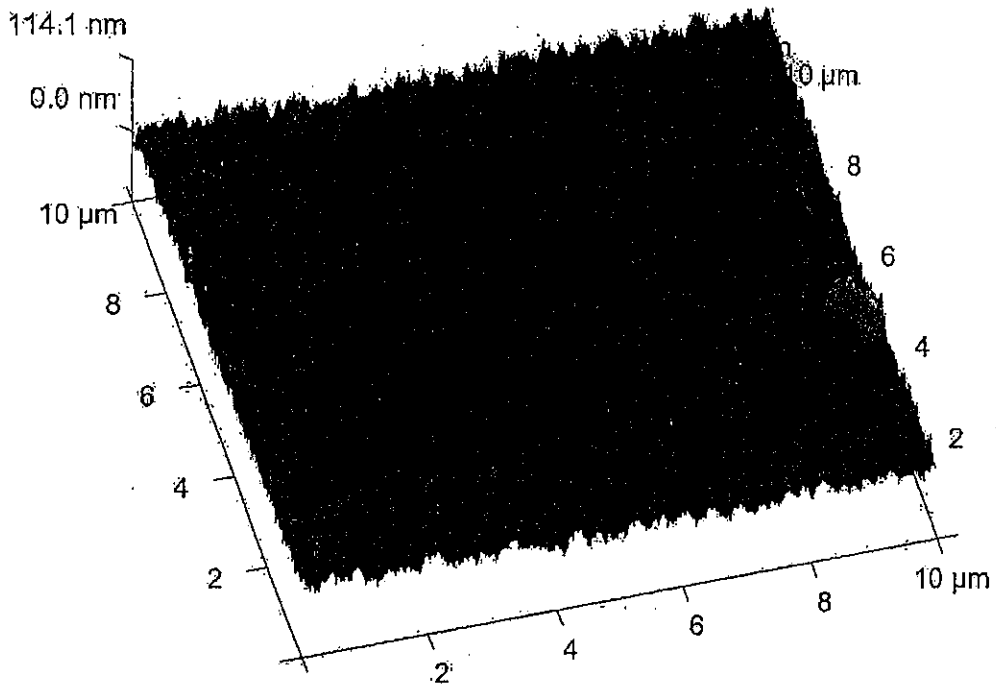


FIG. 1E

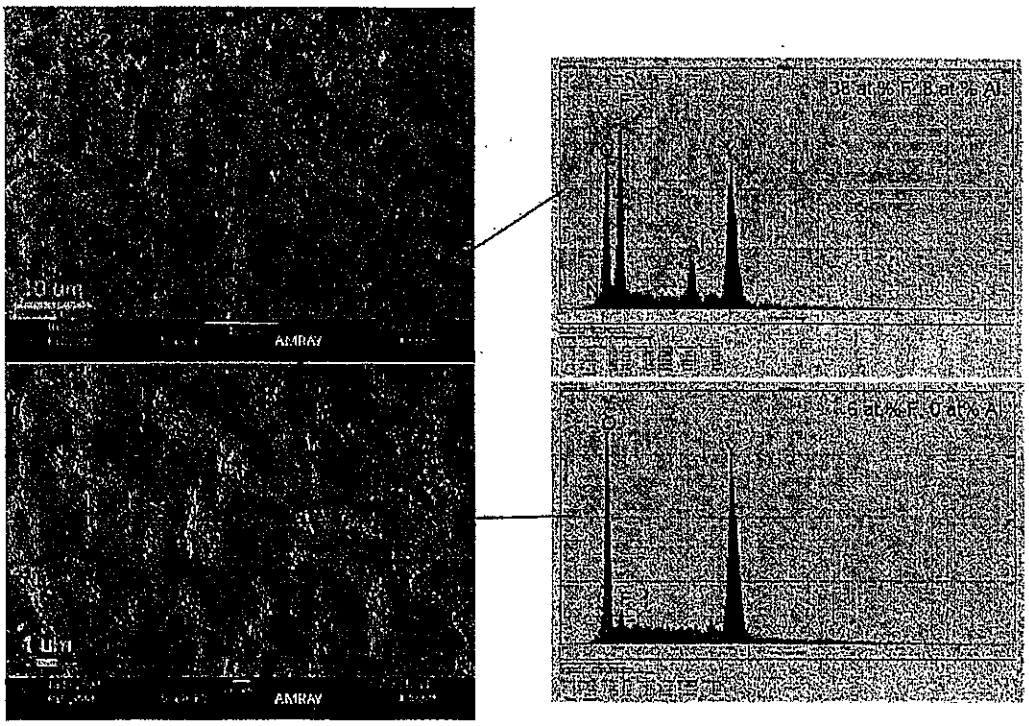
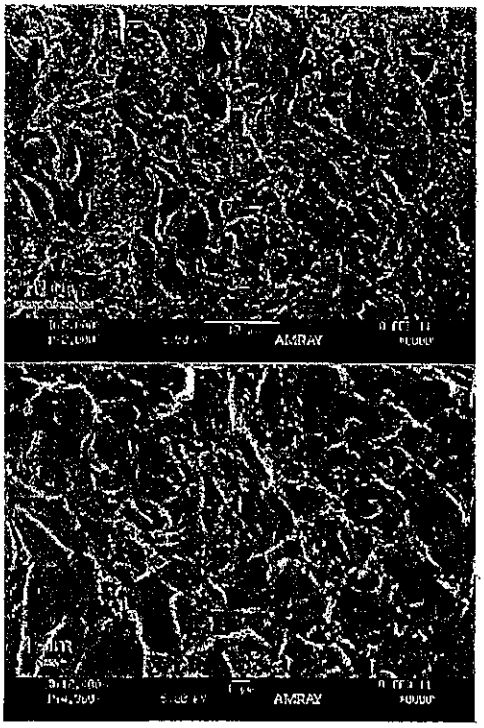
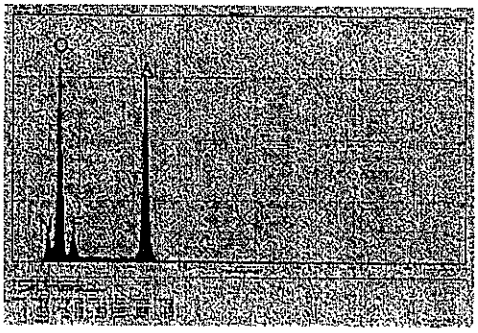


FIG. 1F

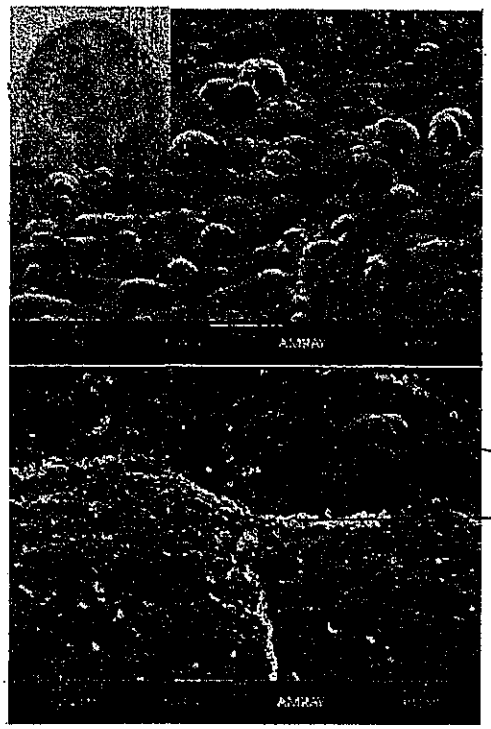




	N	O	F	Al
At. %	8.9	42.2	5.7	43.2

- Coating delaminates between barrier layer and quartz substrate.
- Relatively low concentration of fluorine on backside of coating may indicate that corrosion started from frontside of coating.

FIG. 2

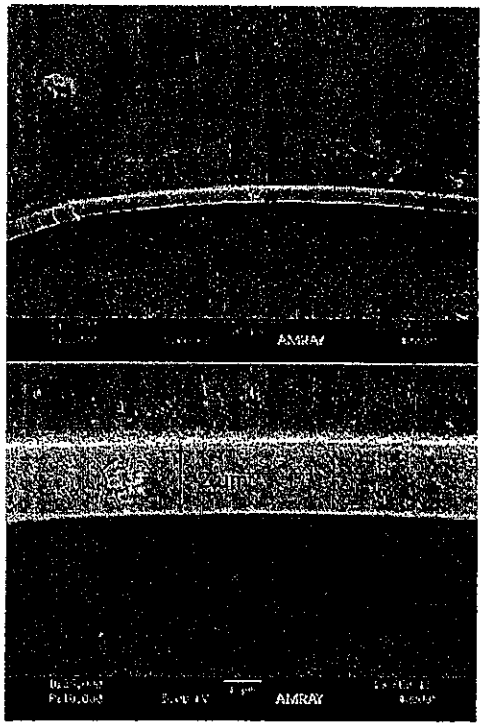




At. %	O	F	Si
Area 1	44.7	1.7	53.6
Area 2	42.2	6.7	51.1

- Exposed quartz substrate exhibits cauliflower-type of micron-size structures.
- Fluorine-rich species detected along the boundaries.

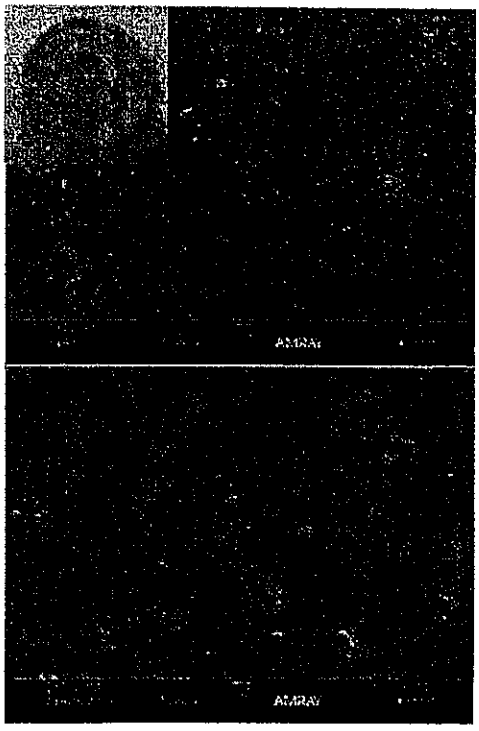
FIG. 3

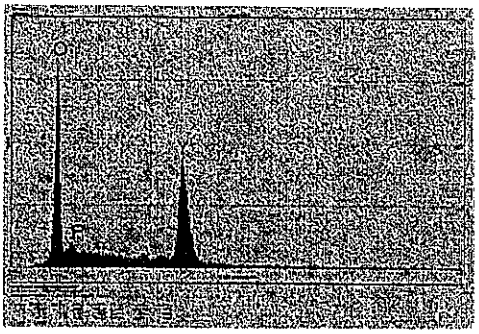


At. %	N	O	F	Al	Si	Y
1	0.6	57.8	0.4	0.0	0.7	40.5
2	0.5	53.9	2.5	0.0	1.1	41.9
3	0.0	28.0	0.0	46.1	1.0	1.1
4	1.9	55.3	0.0	1.0	41.3	0.6

- Cross-section of coating has been analyzed from a fracture.
- Thickness of barrier layer measured about 2 um.
- Thickness of yttria coating measured about 3 um.
- Both coatings are intact after being used in fluorine environment.

FIG. 4





	O	F	Y
At. %	76.3	4.0	19.7

- Yttria coating shows smooth and dense surface that is different from frontside of coating flakes.
- No sign of fluorine corrosion.
- Good adhesion strength: no delamination by Scotch tape test.

FIG. 5

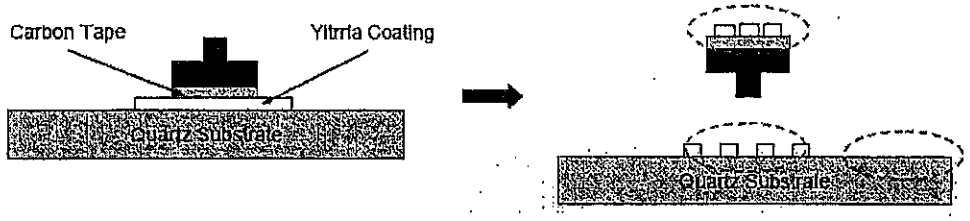

Carbon Tape
Yttria Coating
Quartz Substrate
Quartz Substrate

FIG. 6

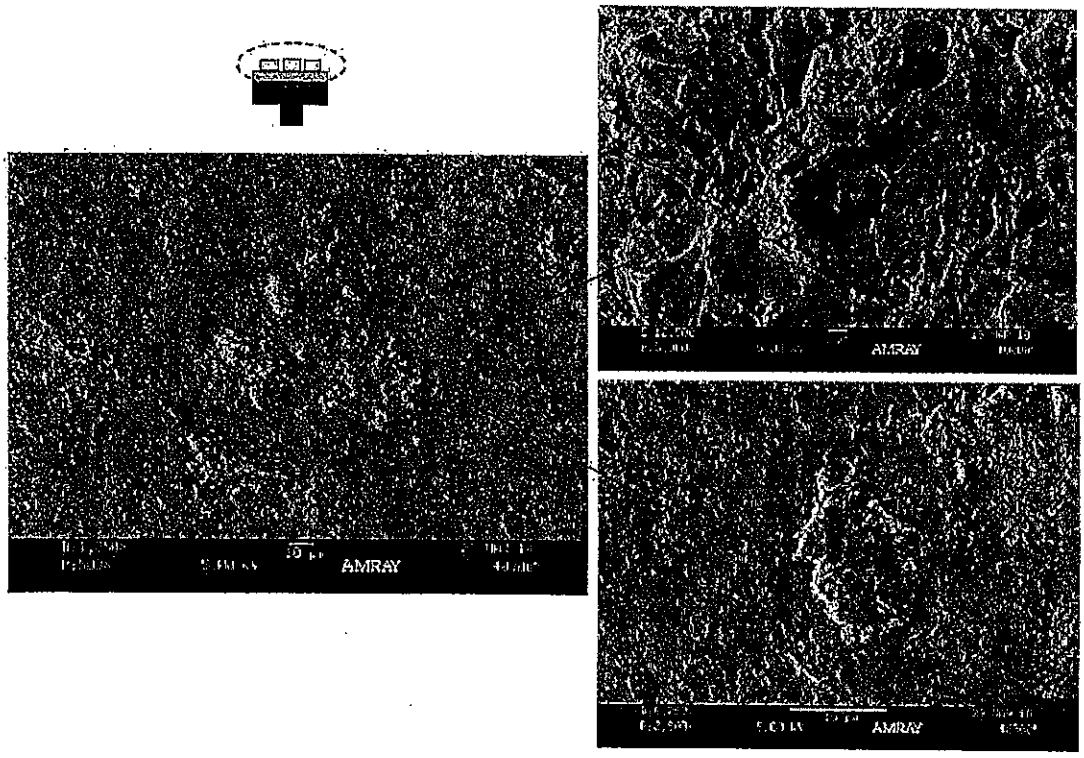
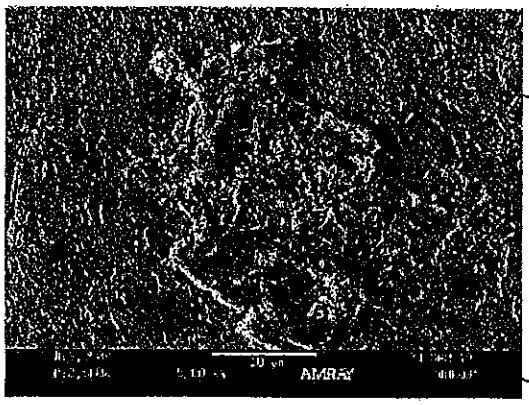
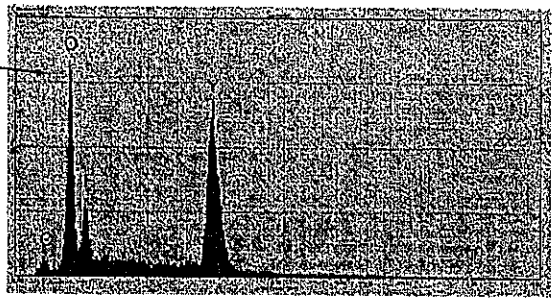
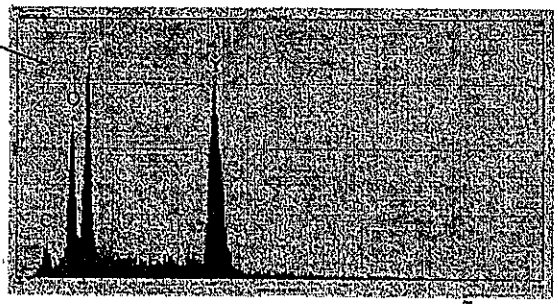


FIG. 7

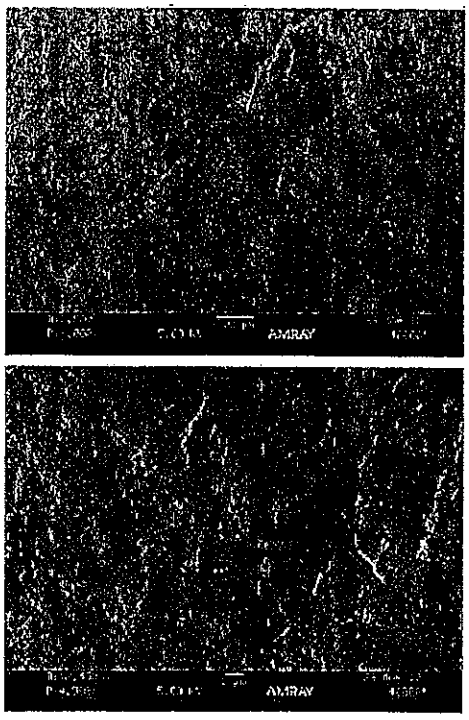


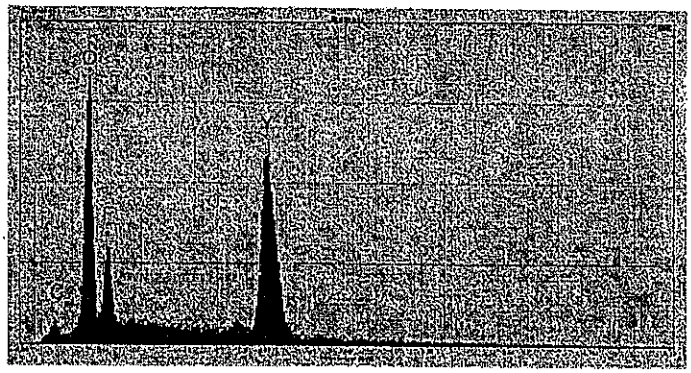




at.%	C	O	F	Y
Coating	2.0	61.8	14.8	21.4
Residue	4.1	34.3	39.9	21.7

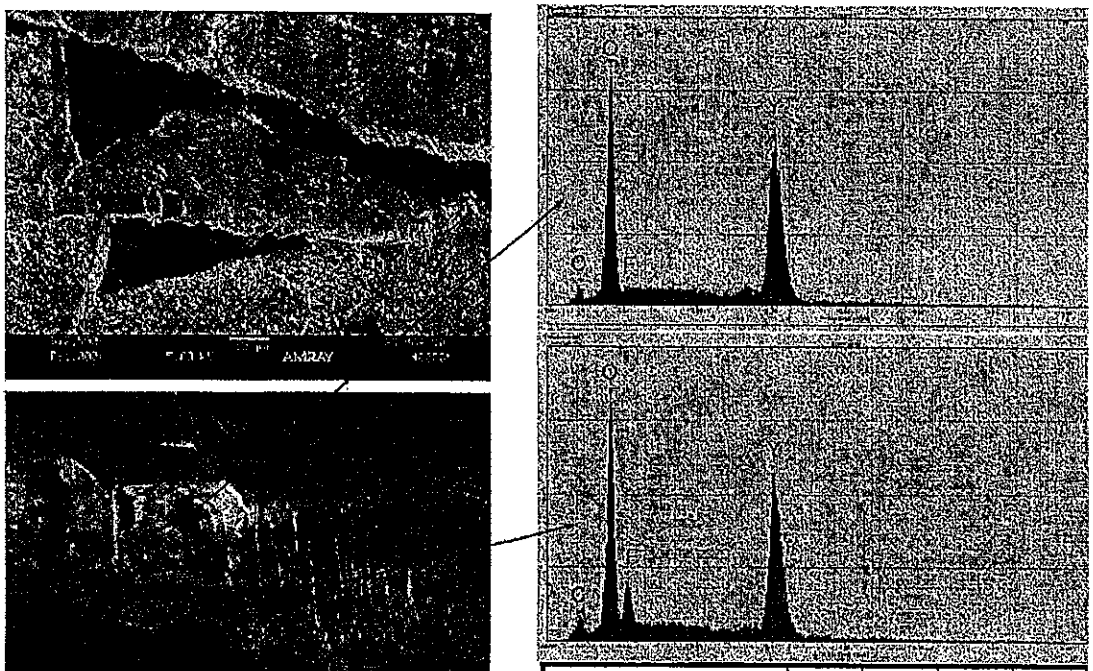
FIG. 8





at.%	C	O	F	Y
Coating (backside)	2.0	61.8	14.8	21.4
Coating (frontside)	2.0	61.4	16.7	19.9

FIG. 9



at.%	C	O	F	Y
Coating (grain)	1.4	74.2	0.0	24.4
Coating (columnar)	2.7	65.4	11.3	20.6

FIG. 10

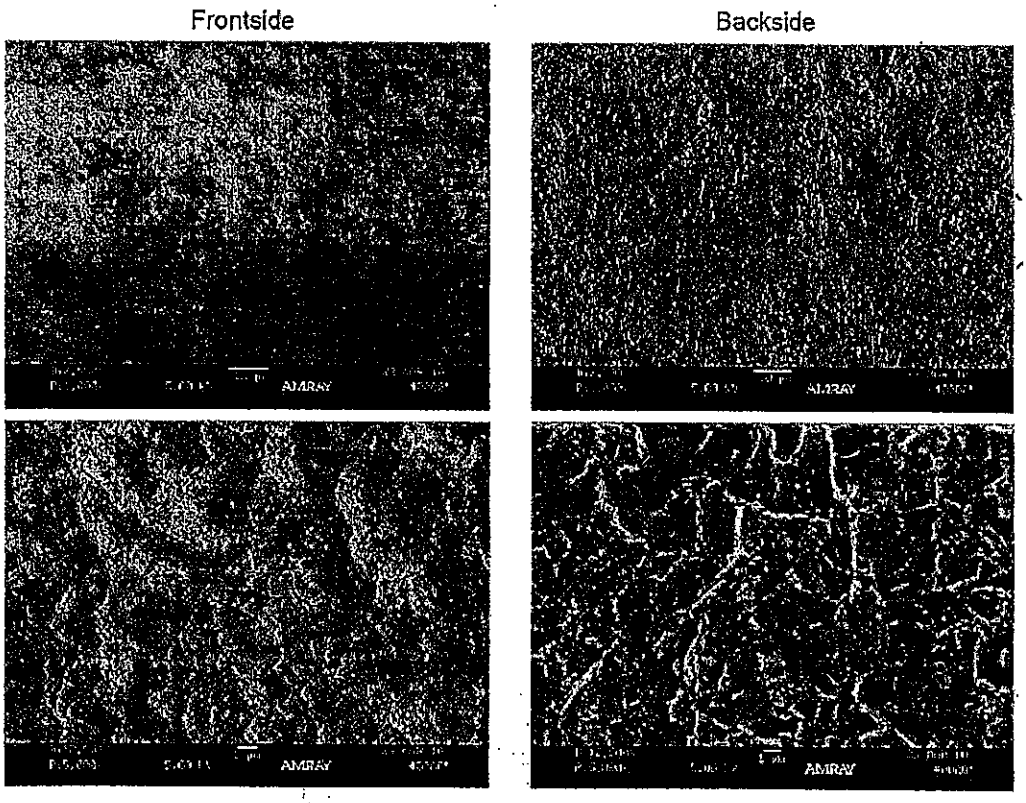


FIG. 11

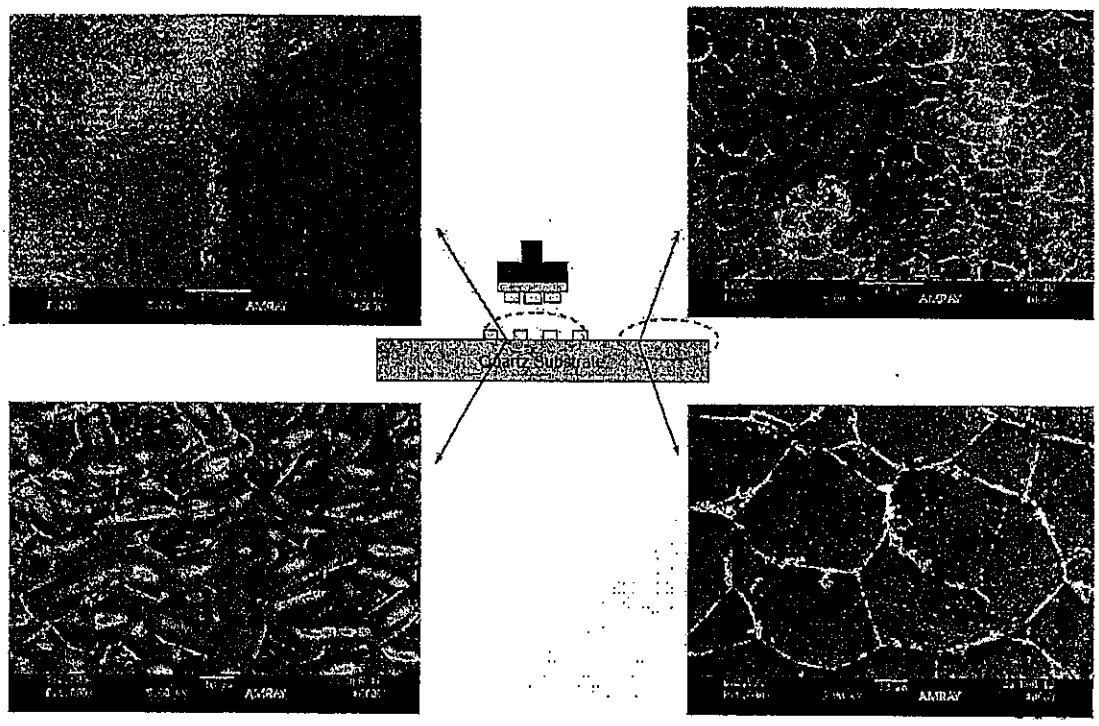


FIG. 12

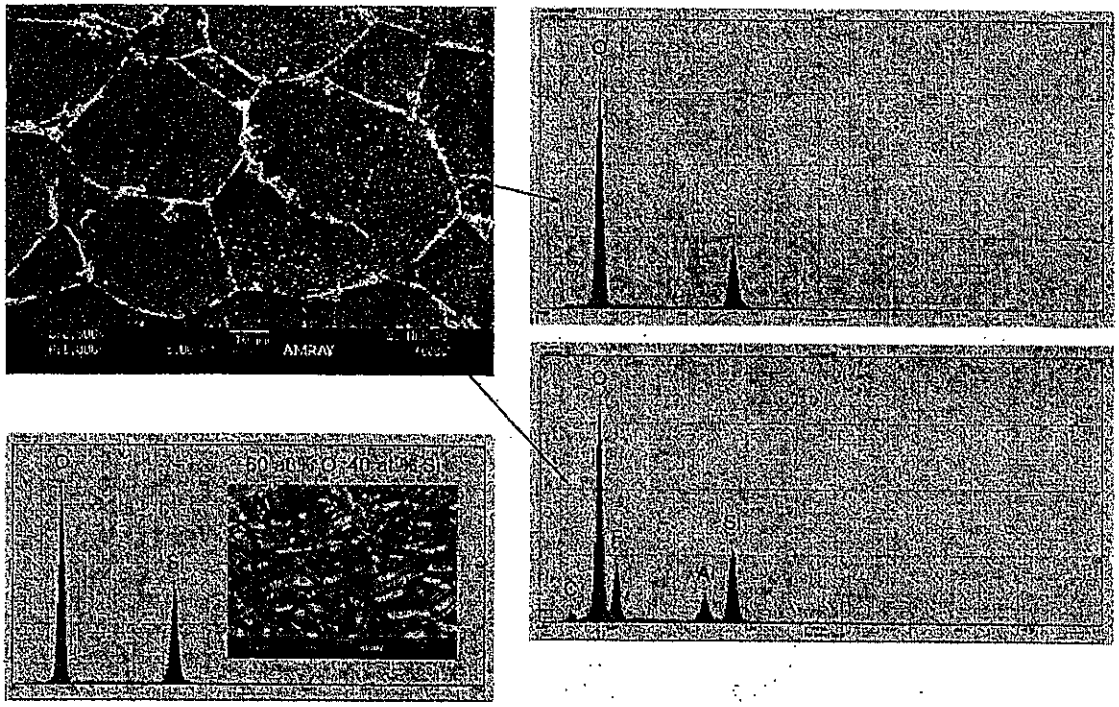


FIG. 13

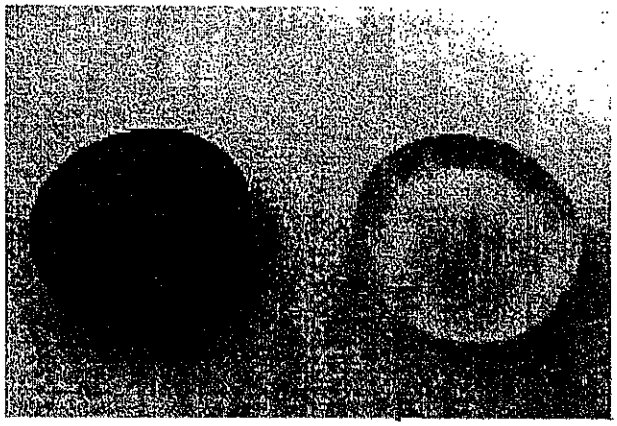


FIG. 14

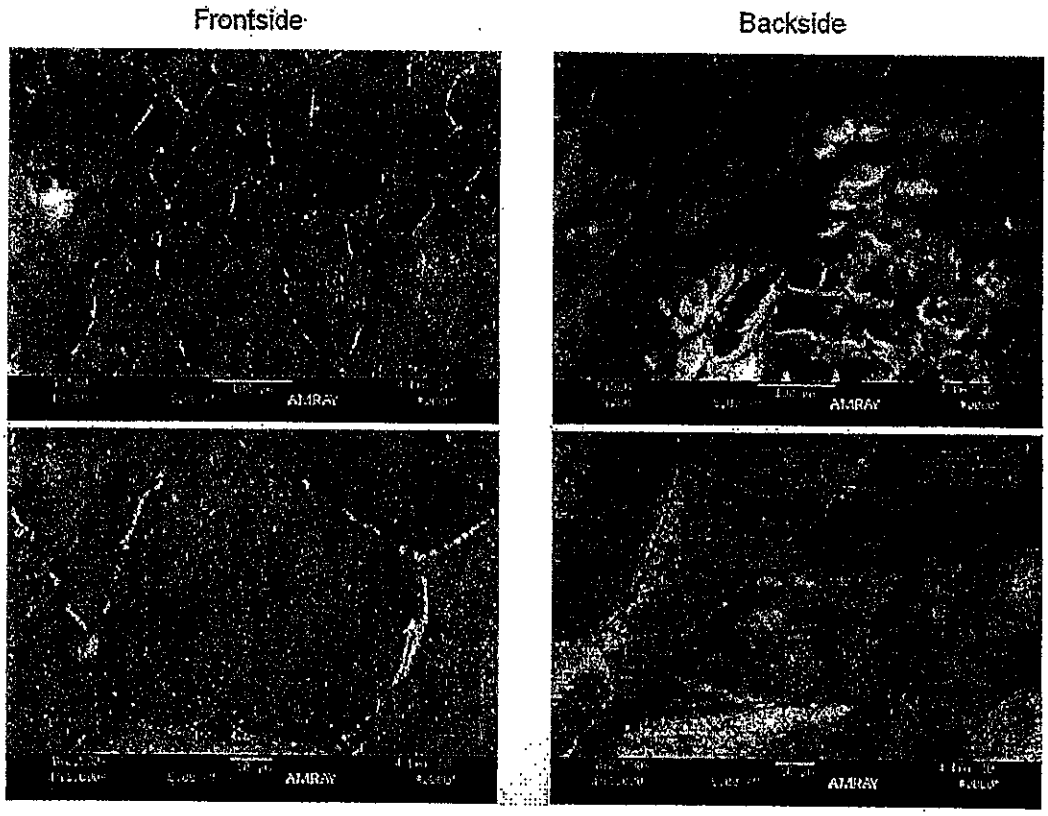


FIG. 15

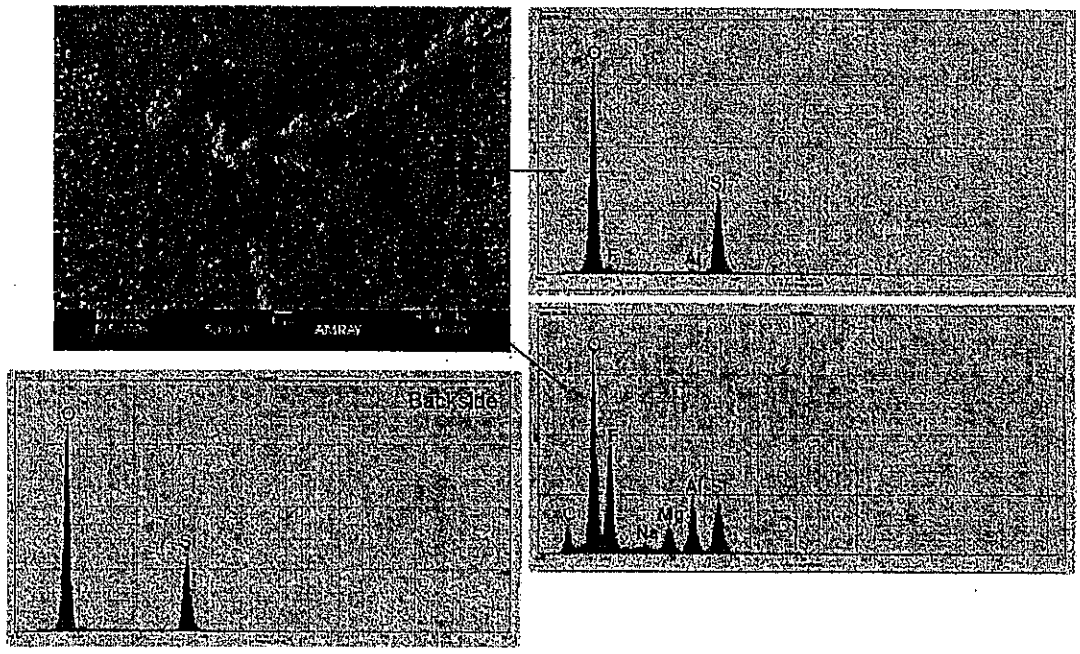


FIG. 16

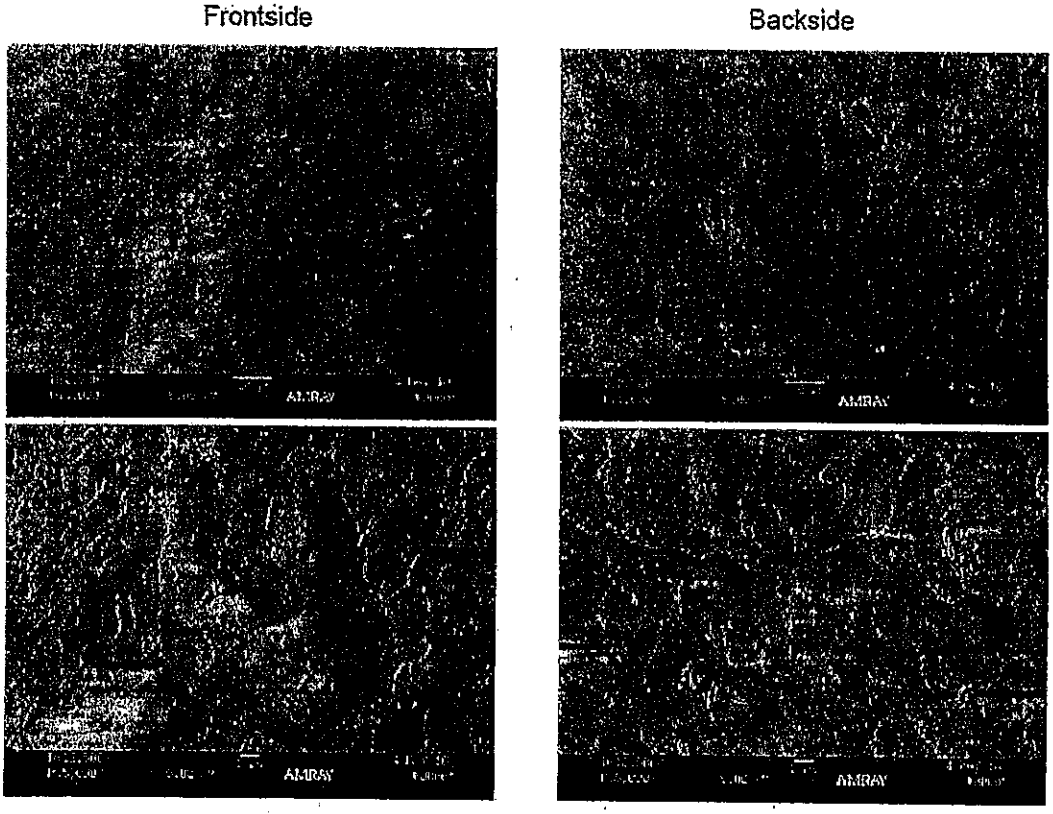
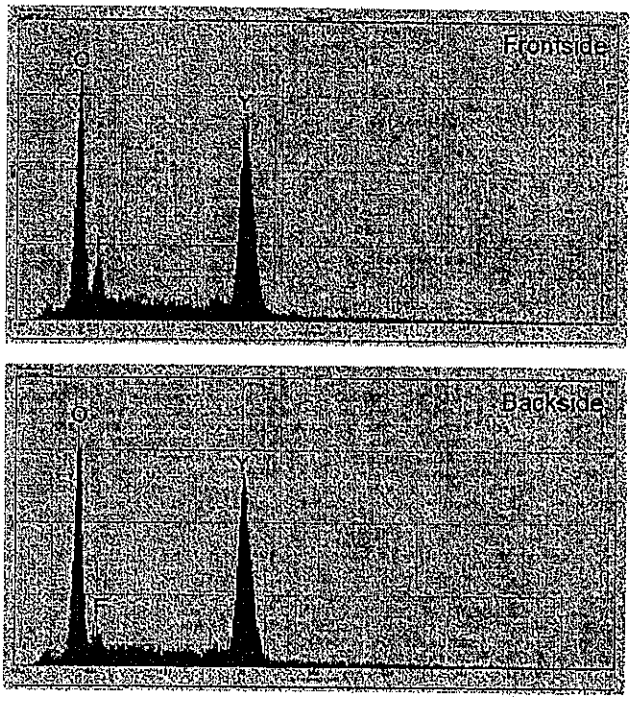


FIG. 17



at.%	O	F	Y
Frontside	65.0	10.0	25.0
Backside	71.3	4.5	24.2

FIG. 18

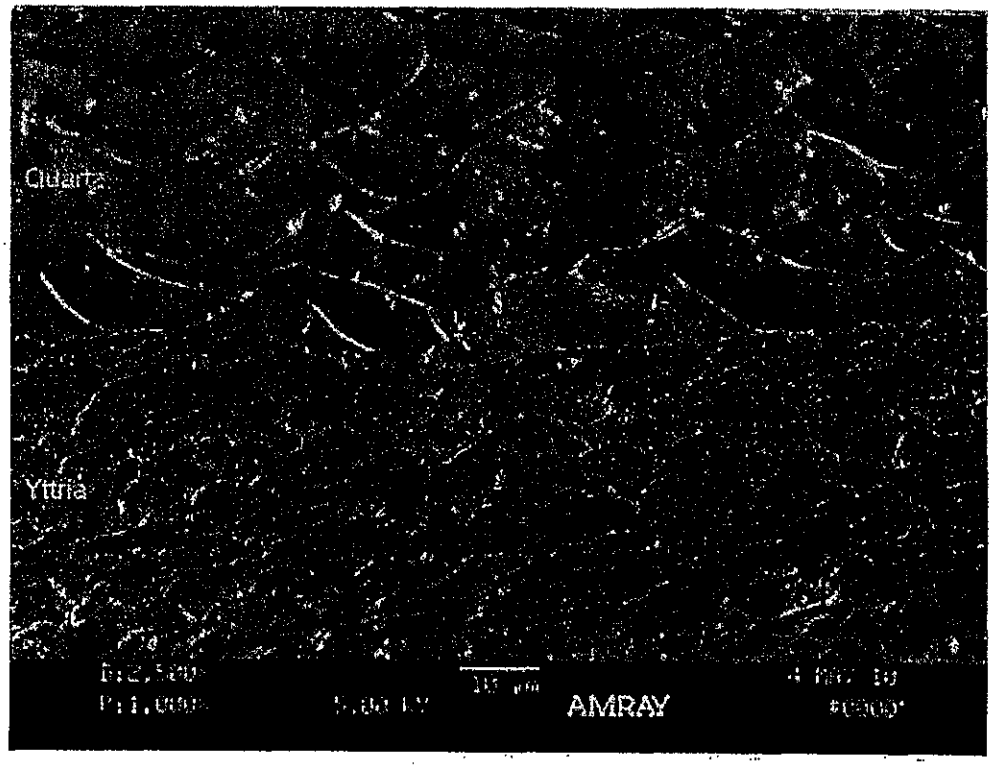


FIG. 19

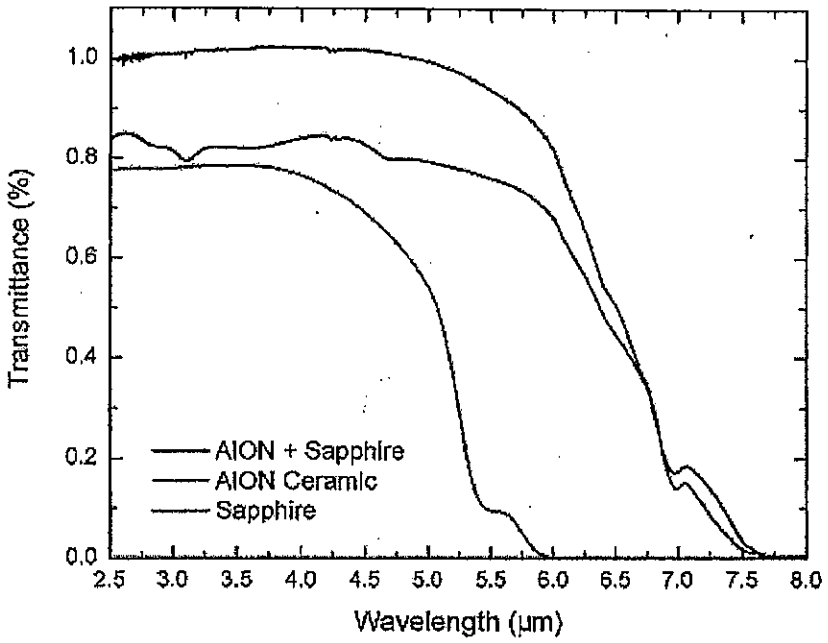

Transmittance (%)
1.0
0.8
0.6
0.4
0.2
0.0
2.5
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0
7.5
8.0
Wavelength (μm)
AlON + Sapphire
AlON Ceramic
Sapphire

FIG. 20