TARGET MATERIAL	DENSITY (G/CC)	YIELD @ 600 EV	RATE (Å/SEC)
Ag	10.5	3.4	380
Al	2.7	1.2	170
$Al_{98}Cu_2$	2.82		170
Al_2O_3	3.96		40
$Al_{99}Si_1$	2.66		160
Au	19.31	2.8	320
Be	1.85	0.8	100
B_4C	2.52		20
BN	2.25		20
C	2.25	0.2	20
Co	8.9	1.4	190
Cr	7.2	1.3	180
Cu	8.92	2.3	320
Fe	7.86	1.3	180
Ge	5.35	1.2	160
Hf	13.31	0.8	110
In	7.3		800
In_2O_3	7.18		20
ITO	7.1		20
Ir	22.42	1.2	135
Mg	1.74	1.4	200
MgO	3.58		20
Mn	7.2	1.3	180
Mo	10.2	0.9	120
MoS_2	4.8		40
$MoSi_2$	6.31		110
Nb	8.57	0.6	80
Ni	8.9	1.5	190
$Ni_{81}Fe_{19}$	8.8		110
$Ni_{80}Cr_{20}$	8.5		140
$Ni_{93}V_7$	8.6		100
Os	22.48	0.9	120
Pd	12.02	2.4	270
Pt	21.45	1.6	205

TARGET MATERIAL	DENSITY (G/CC)	YIELD @ 600 EV	RATE (Å/SEC)
Re	20.53	0.9	120
Rh	12.4	1.5	190
Ru	12.3	1.3	180
Si	2.33	0.5	80
SiC	3.22		50
SiO_2	2.63		70
Si_3N_4	3.44		40
Sn	5.75		800
SnO	6.45		20
Ta	16.6	0.6	85
TaN	16.3		40
Ta_2O_5	8.2		40
Th	11.7	0.7	85
Ti	4.5	0.6	80
TiN	5.22		40
TiO_2	4.26		40
U	19.05	1	155
V	5.96	0.7	85
W	19.35	0.6	80
$W_{90}Ti_{10}$	14.6		80
WC	15.63		50
Y	4.47	0.6	85
YBCO	5.41		10
Zn	7.14		340
ZnO	5.61		40
ZnS	3.98		10
Zr	6.49	0.7	85
ZrO_2	5.6		40

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ProTech Materials

Your Connection to the World of Materials

Rotary Target Bonding

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Rotary Target Bonding

Protech Materials has been manufacturer and supplier of high quality, low cost materials since 1997. Located near San Francisco we have our corporate headquarters and main manufacturing facility that gives us ready access to markets all around the world. With our background and expertise in materials science we are well positioned to offer customers total solutions to most every materials requirements they have.

Inside ID Sleeve Coater Chamber

Among the many capabilities and offering we have are basically all materials for PVD, Sputtering, and Evaporation coating of substrates used in todays many applications of Vacuum coating. To bond these materials to Backing Tubes we offer a Patented Solder process:

Inside OD Backing tube Coater

Plasma Processing Backing tube

- Rotary bonding patent in US, Germany, China
- Incorporates advanced principles
- Up to 4 meters long
- Advantage of our bonding
- Very low level of indium oxidation---high bonding strength
- Very low % voids
- Super clean joints
- Precision sleeve and tile alignments
- Process is semi automated and digitally controlled/measured at each step: leading to ease and known levels of repeatability and capability for fine tuning.

Specialized PLC Controlled Bead Blasting

Rotary Bonding Processing

Overview of the process steps required in preparation and post bonding:

1 - Verifying the dimensions of all components to be assembled.
2 - Surface bead blasting of both Sleeves ID and Backing Tube OD
3 - Cleaning and preparing the surfaces of both Sleeves and Backing Tubes for tri-coating
4 - OD tri-coating Backing Tube
5 - ID tri-coating Sleeves
6 - Assembling Sleeves and Backing tube using specialized fixtures already developed for this process.
7 - Positioning assembly into Heating tower
8 - Running the appropriate Heating Tower Cycle
9 - Removal from Heating Tower and Disassembly of fixturing surrounding the Assembly
10 - Verify assembly with Ultrasonic Scan and dimensional checks
11 - Cleaning and packaging of Assembly

Rotary Bonding Capacity

Through-put (OD coater, ID coater, bonding)
With the assumptions of having the equipment operating optimally the following would apply:

Computer Controlled Bonding Tower

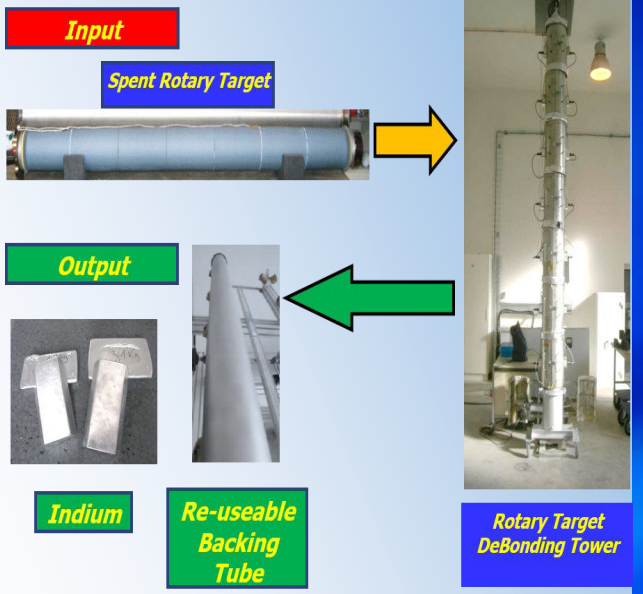
- OD Coater - 5 Backing Tube per 8 hour shift
- ID Coater - 10 - 13 Sleeves per 8 hour shift
- Assembly/construction of Sleeves onto Backing Tube after metallization - 2 per 8 hour shift
- Bonding Tower - Each Tower could do 1 assembly per 8 hour shift (This only includes setup of already assembly Backing Tube and Sleeves ready to be placed in Heating Tower for bonding) The bulk of this time is involved in correctly positioning the assembly into the Heating Tower and the appropriate heat up and cool down times.
- Disassembly, Quality control, Cleaning and packaging: 1per 8 hour shift.

Rotary Bonding Size Capability

limitation on the max length

- **Backing Tube Max is 4 meters for metallization step and heating step.**
- **Sleeves - Current Max length of sleeves for ID processing = 250mm.**
- This ID Sleeve coating system could be modified for longer lengths.

Rotary De-Bonding



ProTech Materials Quality

- ISO 9001:2015 Certified
- Analytical techniques to ensure purity and composition accuracy:
  - ICP
  - LECO
  - GDMS
  - Titration
- Microscopic analysis to achieve good uniformity in target grain size and microstructure to ensure good film uniformity
- 4 point probe to monitor electrical properties of targets
- **Ultrasonic scan to detect bonding and material defects for both planar and rotary targets**
- Various metrology tools to ensure dimensional accuracy
- Well established and competitive supply chain
- Business continuity plan in place