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Aerosol Refactory Paints provide, for the first time, easy application of uniform, thin, protective high-temperature coatings. The use of non-fluorocarbon, nonaqueous-based carrier assures fast drying as well. These aerosol coatings oftentimes can be used to replace more expensive plasma-sprayed coatings in areas where a high-chemical-stability coating is required yet where abrasion resistance is not demanded. These coatings are used wherever anti-stick, barrier, molten-metal resistant coatings are needed on substrates that do not alone meet the requirements--whether the substrates are ceramic, graphite, or metals. A few examples include crucibles, molds, sintering trays, flow tubes, furnace hearths.

Ideal for all R & D Use

USE AREAS and COMPATIBILITY GUIDE

MATL.	USES	COMPATIBILITY: Reportedly Stable at High Temperatures (minimum interaction)	COMPATIBILITY: Reacts at High Temperatures (Unstable)
Y_2O_3	Resistance to molten metals High-temperature lubrication	U, Ti (reacts slightly), Be, V, Cr, Zr, Hf, Ni, Specialty Steels, Copper Alloys, Most Molten Metals, Glasses, Slags, and Salts	Acidic Materials CuO, C (>1500 C, vac.)
ZrO_2	Resistance to molten metals Electrical Insulation Thermal Insulation	Al, Pt, Rh, Zr, Nb, Ta, Mo, W, U, Cu, Fe, Pb, Cr, Mn, Zn, Bi, Be, Ni, Co, Si PbO, Pd, Ru, Steels, Ti or $MoSi_2$(reacts slightly), Acidic Slags, Titanates (below melting)	Basic steel slags, CuO, C (> 1400 C, vac.) Na, Ca, Sr, Ba, Li, K Na_2CO_3
Al_2O_3	Resistance to molten metals Electrical insulation Modest thermal conductivity	Mo, Ni, Nb, Ta, Cu, Sn, Bi, Pr, Rh, W, Pt, Au, Al, Pb, Zn, Ag, V, Co, Fe, Cr, Mn, Steels, Acidic and Basic Slags Silicides, Phosphates, Be (reacts slightly) Mg & Ca (reacts slightly), S, Se, Te, Sb, As, P, Ga, Na_2CO_3	Ti, U, Zr, Hf, Na, Li B, Si, BeO, MgO C (>1500C, vac.), CuO, PbO, ZrO_2 Y_2O_3
BN	Resistance to molten metals High-temperature lubrication Electrical insulation High thermal conductivity Resistance to molten salts Resistance to molten glasses Release agent for ceramic hot-pressing	Al, Mg, Zn, Na, B, Fe, Ni (below melting), Si, Cryolite, KBF_4, $Li_2B_4O_7$, Molten Halide Salts, Steels, Ge, Sb, In, Cu, Sn, Cd, Stainless Steels, Non-Lead Glasses, $MoSi_2$, W, C, ZrO_2 & Y_2O_3 (up to BN dissociation)	Li, Ni (molten), Pt, U Ce, Be, Mo, Cl_2 High-Lead Glasses MoO_3, PbO_x, Cr_2O_7, Sb_2O_3, AsO_3, CuO, Bi_2O_3 Molten K_2CO_3/KOH
TiN	Electrical conductivity High stability with C/graphite Resistance to molten metals Moderate thermal conductivity	Sn, Bi, Fe, Carbon Steel, Basic Slag, Acid Slag, W, Mo, Nb, Ta to 1800 C, Al (wets), U, Ce, Sm-Co and Rare Earth Metals	NaOH, Be, Cd, Pb (weak reaction), MgO, Cryolite, ZrO_2>1300C, Na, K

TECHNICAL PRODUCT DATA

Properties	Y_2O_3	ZrO_2	Al_2O_3	BN	TiN
Purity (of refractory)	99.9%	>99% (incl. 4% CaO)	>99%	>97% (Bal.B_2O_3)	>99%
Max. Use Temp. (C)					
Air	1900	1900	1800	1100	350
Vacuum	1900	1900	1800	1400	1600
Inert	1900	1900	1800	1800	1900
Vacuum + Carbon	1500	1400	1500	1400*	1600*
Use Atmosphere	All	All	All	All	All
Hardness Rating	Low-Med	Low-Med	Low-Med	Low-Med	Low-Med
Fired composition	1% G.C.** 2% M.S. Bal Y_2O_3	1% G.C. 2% M.S. Bal ZrO_2	4% G.C. 4% M.S. Bal Al_2O_3	6% G.C. 6% M.S. Bal BN	1% G.C. 2% M.S. Bal TiN
Carrier	Acetone, Propane, Butane, Alcohol for ALL				
Color	White	Cream	White	White	Golden Brown
Shelf Life	OVER 6 MONTHS for ALL				
Coverage	30-50 ft^2/can for ALL				
Outgas Temp. (C)	350-600 C (NOTE: do not exceed 350 C in air for TiN)				
Outgas Products	H_2O/CO_x for ALL				
H, F, R Ratings	2-4-O for ALL				
Substrate Use	Metals, ceramics, graphite—for ALL				

* Due to vaporization/sublimation ** G.C.-Glassy Carbon, M.S.-Magnesium Silicate

BASIC MATERIAL PROPERTIES

*(for pure materials/fully dense; may differ from coating)

PROPERTY	Y_2O_3	ZrO_2	Al_2O_3	BN	TiN
Formula Wt. (g)	225.8	123.2	102.0	24.8	61.9
Density (g/cc)	5.0	5.6	4.0	2.3	5.4
Crystal Structure	b.c.c.	Cubic/Monocl.	hex.	hex.	f.c.c.
Thermal Expansion (25-1000 C: 10^{-6}mm/mm-C)	8.2	10.5	8.5 directional	0.8-7.5	8.7
Melting point (C)	2415	2600	2050 sublimes	>2400	2950
Specific Heat (@293K, cal/g-K)	0.109	0.109	0.184	0.117	0.179
Thermal Conductivity (cal/cm-sec-K)					
@100C	0.034	0.005	0.072	0.075 av.	0.069
@1400C	0.007	0.006	0.013	0.050 av.	0.018 est.
Electrical Resistivity (@293K, ohm-cm)	10^8	10^7-10^8	10^{16}	10^{13}	22 x 10^{-6}
Emissivity @ 1300K	0.3	0.45	0.45	0.6	0.7
Chemical Resistance (molten metals/slags)	Superior	Excellent	Good	Good	Good
Color	White	Cream	White	White	Golden Brown
Knoop Microhardness (kg/mm^2 @ 100g load)	700	1300	2100	200	1800