

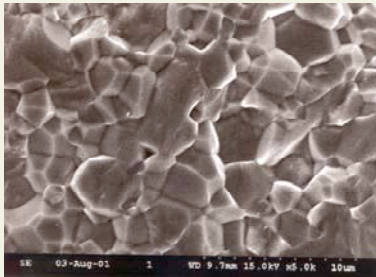
# High Dielectric Constant Piezoceramic

## TRS-HKI-HD A new standard for array transducers

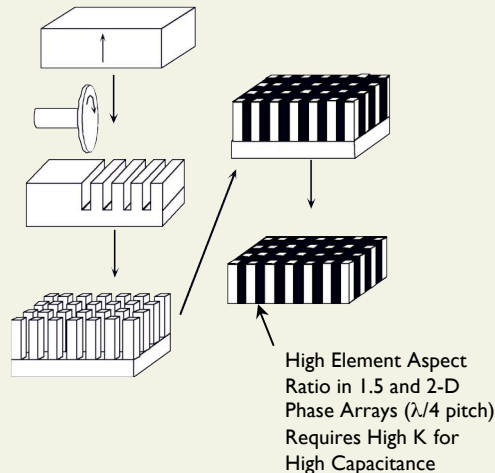
TRS-HKI-HD is a high dielectric constant piezo ceramic with very high density and outstanding piezoelectric properties. These properties allow improved impedance matching of piezo elements and drive electronics in 1-2D phased array transducers.

### Benefits of HKI

- High Density for improved machinability (>99.9%)
- High K for improved impedance matching (~6500)
- $d_{33}$  10% higher than Navy Type VI for actuator applications (800 pC/N)
- Proven composition with good reproducibility and more than three years of commercial sales.



SEM Microstructure of HKI  
Grain Size ~5-7 $\mu$ m



### Typical Commercial Uses

Ultrasound arrays, piezo actuators, deformable mirrors

### HKI Specifications

Property	High K	PZT-5H	PZT-5A
	HKI-HD	610-HD	200-HD
Free $K_3$	6500	3900	2050
Clamped $K_3$	2500	1250	875
Loss	0.017	0.018	0.018
$T_c$ ( $^{\circ}$ C)	150	210	340
$P_r$ ( $\mu$ C/cm <sup>2</sup> )	28	35	35
$E_c$ (kV/cm)	5	7.8	13.5
$d_{33}$ (pC/N)	800	690	400
$d_{31}$ (pC/N)	-360	-340	-190
$d_{15}$ (pC/N)	840		550
$k_{33}$	0.74	0.80	0.73
$k_{31}$	-0.39	-0.46	-0.37
$k_p$	0.66	0.73	0.66
$k_t$	0.50	0.56	0.49
Density (g/cm <sup>3</sup> )	8.00	7.95	7.90

### HKI Size and Metallization Options

	Dimensional Range	Tolerances (+/-)	
		Standard	Fine
X (mm)	0.25-90	0.1	0.025
Y (mm)	0.25-65	0.1	0.025
Thickness (mm)	0.10-15	0.025	0.01

#### Notes:

Size range can be extended on request  
Tolerances can be reduced on request

#### Electrodes:

Sputtered Cr/Au 500/2000  $\text{\AA}$  (standard)  
Sputtered Ni/V 2000-3000  $\text{\AA}$   
Others on request