

Printed Electronic Materials Product Line Overview



JNC Corporation has a 15 year history in the development and commercialization of Printed Electronic Materials. JNC's Printed Electronic Materials are inkjet printable polymeric materials used as electrical insulators, structural and masking materials. These materials offer improved performance and processability in various electronic, display, semiconductor, MEMS, biotech and energy applications.

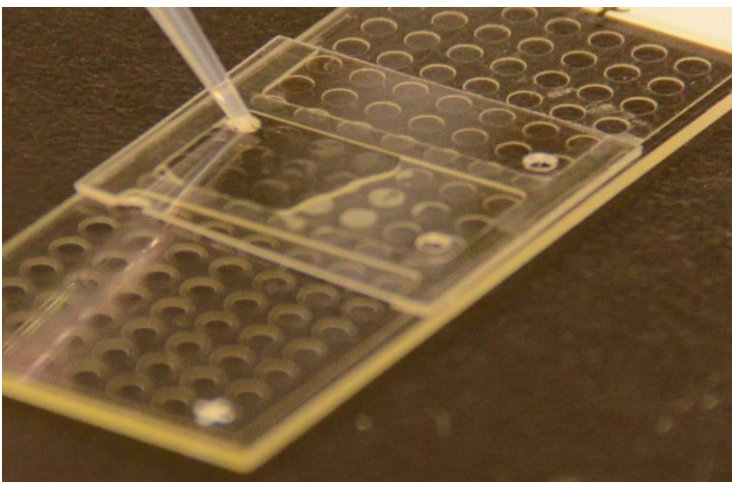
JNC's Printed Electronic Materials product line includes a series of thermal-cure polyimide (PI) and UV-cure polyacrylate (PA) materials suitable for a wide variety of inkjet printheads.

More specific applications include:

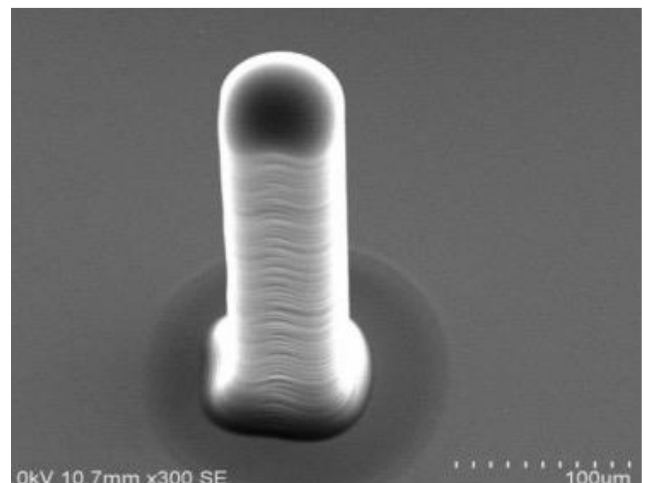
- Power, logic and analog ICs
- Wafer-level and embedded substrate packaging
- Temporary bonding agents
- CMOS imaging sensors
- Dry etch and CVD masks

JNC's PI- and PA- inkjet printable materials are unique in the industry in that they offer:

- High-speed UV-cure or higher heat resistant thermal-cure
- Reliable jetting and fine feature printing
- High substrate adhesion
- Mechanical and dimensional stability over a wide temperature range
- Long-term electrical insulation reliability



Inkjet printed UV-cure polyacrylate array in next-generation biotech product



3.5:1 aspect ratio inkjet printed UV-cure polyacrylate

Product Table

Property	PI-6643-004	PI-6302-004	PI-6322-001	PI-6673-001 ⁽¹⁾	PA-1210-020	PA-1210-035	PA-1210-034 ⁽¹⁾
Solids content [wt.%]	25	25	24	25	100	100	100
Viscosity [mPa*s] @ 25°C	12	6	11	8	23	36	35
Surface tension [mN/m] @ 23°C	30	27	28	28	30	31	31
Printing methods	Inkjet	Inkjet	Inkjet	Inkjet	Inkjet	Inkjet	Inkjet
Curing	350°C 30min	230°C 30min	180°C 120 min	175°C 60min	2,000mJ/cm ² @ 365nm	2,000mJ/cm ² @ 365nm	2,000mJ/cm ² @ 365nm
Post-curing ⁽²⁾	-	-	-	-	175°C 60 min.	175°C 60 min.	200°C 60 min.
Volume resistivity [Ω *cm]	1E+16	1E+16	1E+16	1E+16	1E+16	6E+16	1E+15
Breakdown voltage [V/um]	150	100	100	200	100	100	80
Dielectric constant (1kHz) @ 1V	3.2	3.5	3.8	2.8	3.2	3.1	3.1
Tensile modulus [MPa]	1530	780	1500	930	1800	1400	1600
Elongation [%]	3	3	6	24	3	3	4
Residual stress [MPa]	57	32	N/A	15	12	19	14
5% weight loss Temp. [°C]	435	390	370	375	275	292	295
CTE (<Tg) [ppm/K]	60	65	75	140	55	76	91
Tg [°C]	395	255	250	130	116	126	136
Water absorbance [%] @ 23°C	2.0	1.0	1.0	0.7	0.2	< 0.1	0.4

(1) Development Stage Product: Samples, data, shipments, etc. may be limited. (2) Post-curing recommended for higher reliability applications.

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