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## Supporting Information

# Non-Covalent Functionalization of CNT by Polycarbazole: Chemiresistive Humidity Sensor with Tunable Chemo-Electric Attributes at Room Temperature

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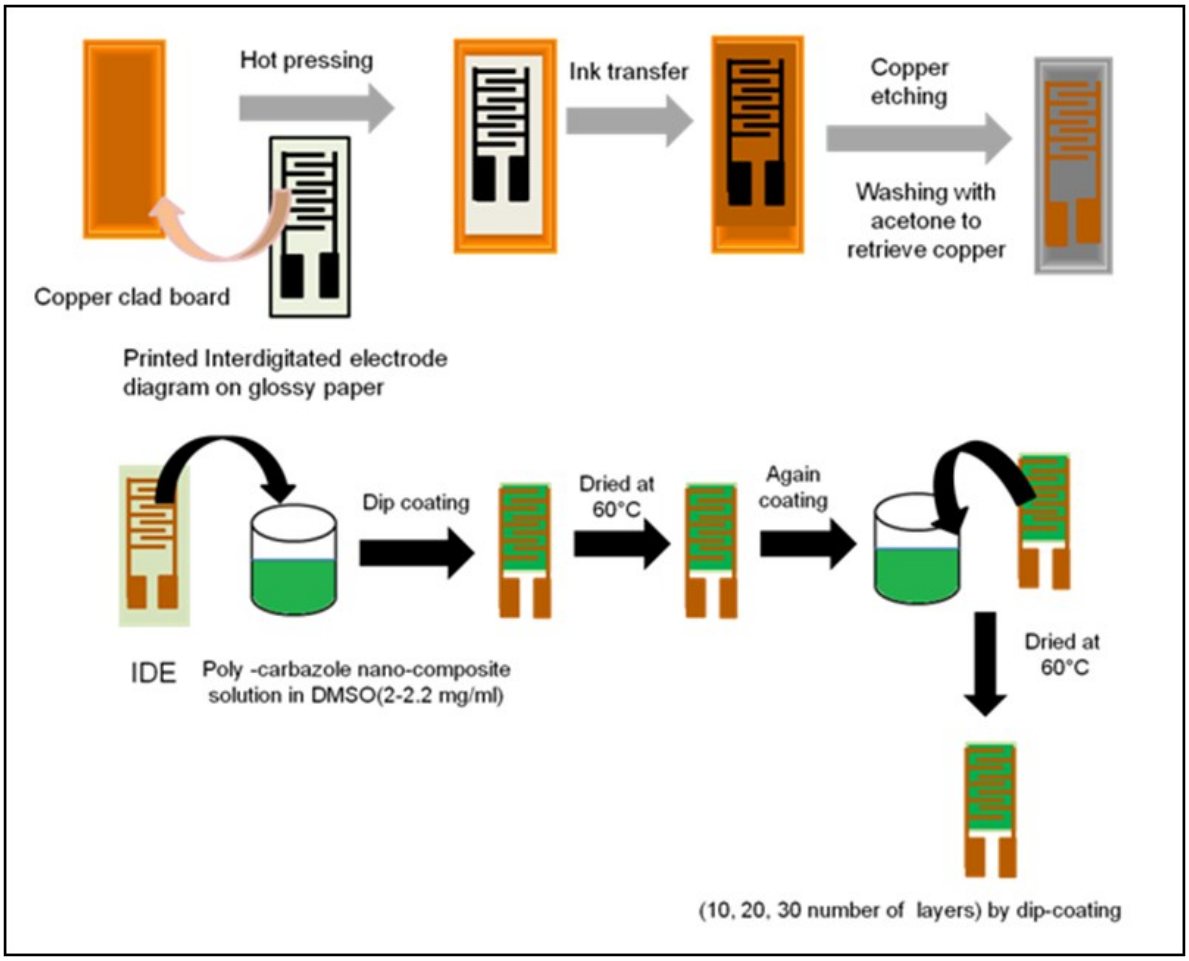


**Fig.S1:** Humidity sensing substrate and film preparation

**Table-S1: Condition of preparation of PCz- CNT nanocomposite**

| Sample | Carbazole in chloroform (gm.) | PTSA in chloroform (gm.) | Weight of CNT taken(mg.) | Benzoyl peroxide taken(gm.) |
|---|---|---|---|---|
| PCz | 1 | 2.5 | 0 | 2.2 |
| CNT-PCz(0.5%) | 1 | 2.5 | 5 | 2.2 |
| CNT-PCz (1%) | 1 | 2.5 | 10 | 2.2 |
| CNT-PCz (3%) | 1 | 2.5 | 30 | 2.2 |
| CNT-PCz (5%) | 1 | 2.5 | 50 | 2.2 |

**Table-S2: TGA Analysis of Nanocomposites**

| **Mass loss (%)** | **RT-100°C** | **100°C- 400°C** | **400°C- 700°C** |
|---|---|---|---|
| Pristine PCz | 2% | 15% | 78% |
| PCz-CNT (0.5wt. %) | 3% | 15% | 77% |
| PCz-CNT (1wt. %) | 3% | 14% | 74% |
| PCz-CNT (3 wt. %) | 2% | 12% | 73% |
| PCz-CNT (5 wt. %) | 2% | 12% | 72% |

**Table-S3: Comparison of CNT-PCz sensor with other polymer based chemiresistive humidity Sensors**

| Composition | RH range (%) | Response (%) | Detection Mode | Response time(s) | Recovery time(s) | Deposition Method | Reference |
|---|---|---|---|---|---|---|---|
| MWCNT-PVA | 11-100 | 0 – 32.3 | Resistive | - | - | Drop casting | 45 |
| CNT-PI | 5–97 | 56.25 | Resistive | 2 | 30 | Dip-coating | 46 |
| GO-Polymer | 10-100 | 8.69 -37 | Resistive | 108-147 | 94-133 | LBL self assembly | 47 |
| CNT-PI | 10-100 | 41.66 | Resistive | - | - | Spin coating | 42 |
| Highly crystalline PANI film | 30-80 | 61.53 | Resistive | 30 | 80 | Spin coating | 48 |
| MWCNT | 25-95 | 37.93 | Resistive | 3 | 25 | Dielectrophoresis | 49 |
| Chitin-PANI | 20-100 | 50 | Resistive | 30 | 180 | Electron beam irradiation blending | 50 |
| $SnO_2$-PANI | 5-95 | 12.5 | Resistive | 26 | 30 | Pellet | 51 |
| **CNT-PCz** | **23-97** | **6-70** | **Resistive** | **13-25** | **22-65** | **Dip-coating** | **Our work** |