**Supporting information**

**Microwave Absorption Efficiency of Poly (vinyl-butyral)/Ultra-thin Nickel Coated Fly Ash Cenosphere Composite**

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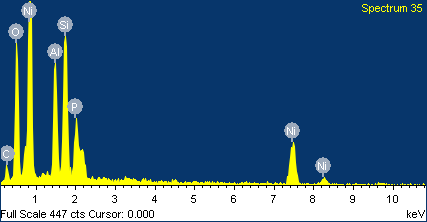
**‡***Contribution of both the authors are equal.*

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**Figure S1. (a)** Schematic of PVB-Ni-FAC composite preparation. Optical images of PVB-Ni-FAC (S3) composites in **(b)** Ku-band and **(c)** X-band sample holders.

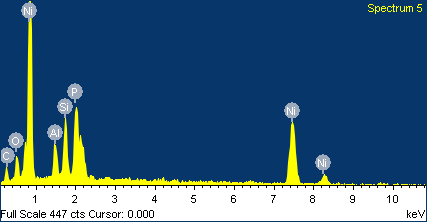
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**Figure S2.** **(a)** Vector network analyser, **(b)** Schematic of VNA, **(c)** Schematic of setup for EMI shielding measurements, **(d)** X-band coaxial to waveguide adaptor.



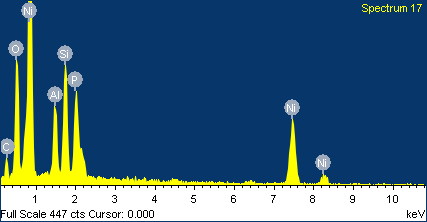
|  |  |  |  |
| --- | --- | --- | --- |
| Element | Weight% | Atomic% |  |
|  |  |  |  |
| C K | 10.55 | 21.89 |  |
| O K | 24.32 | 37.89 |  |
| Al K | 9.19 | 8.49 |  |
| Si K | 13.16 | 11.68 |  |
| P K | 4.96 | 3.99 |  |
| Ni K | 37.82 | 16.06 |  |
|  |  |  |  |
| Totals | 100.00 |  |  |

**Figure S3.** EDX results of 5 min electroless Ni coated FAC



|  |  |  |  |
| --- | --- | --- | --- |
| Element | Weight% | Atomic% |  |
|  |  |  |  |
| C K | 11.89 | 26.57 |  |
| O K | 18.97 | 31.83 |  |
| Al K | 5.34 | 5.31 |  |
| Si K | 8.74 | 8.35 |  |
| P K | 6.76 | 5.86 |  |
| Ni K | 48.30 | 22.08 |  |
|  |  |  |  |
| Totals | 100.00 |  |  |

**Figure S4.** EDX results of 10 min electroless Ni coated FAC.



|  |  |  |  |
| --- | --- | --- | --- |
| Element | Weight% | Atomic% |  |
|  |  |  |  |
| C K | 11.03 | 30.73 |  |
| O K | 5.44 | 11.37 |  |
| Al K | 3.80 | 4.71 |  |
| Si K | 6.07 | 7.23 |  |
| P K | 7.82 | 8.44 |  |
| Ni K | 65.84 | 37.52 |  |
|  |  |  |  |
| Totals | 100.00 |  |  |

**Figure S5.** EDX results of 15 min electroless Ni coated FAC.

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**Figure S6.**  Thickness dependent RL (dB) of S0 (PVB-FAC).

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**Figure S7.**  Thickness dependent RL (dB) of 20 minutes Ni -FAC loaded PVB composite.