Combustion synthesis of highly crystalline boron nitride nanosheets and their application in thermoconductive polymeric composites

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TEM image of combustion synthesis BNNS

Fig. S1 (a,b)
Fig. S2 FTIR Characterization of the combustion synthesis BNNS
Fig. S3 (a) High-resolution B1s XPS scans of BNNS
(b) High-resolution N1s XPS scans of BNNS
**Table S1** Conversion of mass fraction into volume fraction and calculation method

<table>
<thead>
<tr>
<th></th>
<th>BNNS wt%</th>
<th>BNNS vol%</th>
<th>Density/(g/cm³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EP</td>
<td>5.7</td>
<td>2.5</td>
<td>1.01</td>
</tr>
<tr>
<td>BNNS/EP</td>
<td>11.0</td>
<td>5.0</td>
<td>1.04</td>
</tr>
<tr>
<td>BNNS/EP</td>
<td>14.6</td>
<td>7.5</td>
<td>1.07</td>
</tr>
<tr>
<td>BNNS/EP</td>
<td>20.6</td>
<td>10</td>
<td>1.11</td>
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<td>BNNS/EP</td>
<td>29.2</td>
<td>15</td>
<td>1.18</td>
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<tr>
<td>BNNS/EP</td>
<td>36.9</td>
<td>20</td>
<td>1.24</td>
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<tr>
<td>BNNS/EP</td>
<td>38.34</td>
<td>21</td>
<td>1.26</td>
</tr>
</tbody>
</table>

The volume fraction of BNNS can be calculated according to the following equation:

\[
BNNS \text{ vol\%} x = \frac{\text{wt\%}}{\rho_{BNNS}} \cdot \left(\frac{\text{wt\%}}{\rho_{BNNS}} + \frac{(1 - \text{wt\%})}{\rho_{EP}}\right)
\]

\[
\rho_{BNNS} = 2.29 \text{ g/cm}³, \rho_{EP} = 0.98 \text{ g/cm}³,
\]

The density of BNNS/EP composites can be calculated according to the following equation:

\[
\rho_{\text{composites}} = x \cdot \rho_{BNNS} + (1 - x) \cdot \rho_{EP}
\]
Fig. S4 Volume resistivity of BNNS/EP composites

Fig. S5 Breakdown strength of BNNS/EP composites