# Supplementary information

## Supported ammonia borane decomposition through enhanced homopolar B-B coupling

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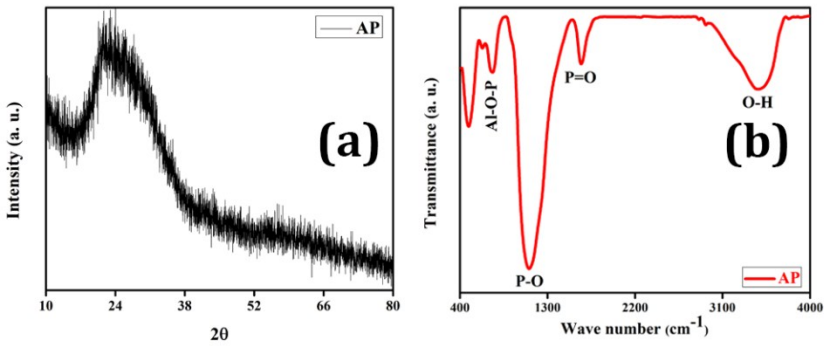


Figure S1: (a) XRD and (b) FTIR of the synthesized $AlPO_4$ support material

Table S1: FTIR frequencies for synthesized Aluminium phosphate (AP)

| Bonding Vibration | Vibrational frequency ($cm^{-1}$) |
|---|---|
| Al-O-P Vibrations | 494, 732 |
| P-O stretching | 1111 |
| P=O stretching | 1645 |

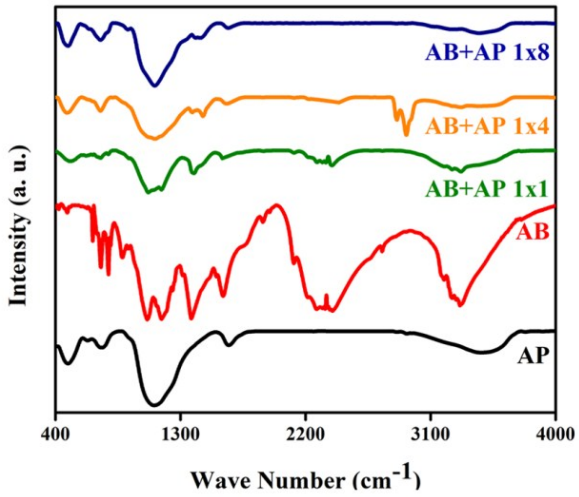


Figure S2: FTIR spectra of AB+AP samples

Table S2: FTIR vibrational frequencies of AB[1]

| Vibrational frequencies ($cm^{-1}$) | FTIR Peak Annotation |
|---|---|
| 603 | NBH Rocking |
| 968 | $^{11}$B-N Stretching ($A_1$) |
| 987 | $^{10}$B-N Stretching ($A_1$) |
| 1175 | $BH_3$ deformation ($A_1$) |
| 1186 | $BH_3$ deformation (E) |
| 1377 | Unassigned |
| 1396 | Unassigned |
| 1608 | $NH_3$ deformation |
| 2340 | Sym. B-H stretching ($A_1$) |
| 2415 | Assym. B-H stretching (E) |
| 3177 | Unassigned suggested (overtone) |
| 3337 | Sym. N-H Stretching($A_1$) |
| 3386 | Asym. N-H stretching (E) |

Table S3: AUC comparison of peaks observed in $^{11}$B spectra of pure AB and AB+AP 1×1

| | Pure AB@10 (%) | AB+AP(1×1)@10 (%) |
|---|---|---|
| Peak 1 (30 ppm) | 82.17 | 61.17 |
| Peak 2 (24 ppm) | 6.26 | 21.54 |
| Peak 3 (6.4 ppm) | 11.56 | 17.28 |

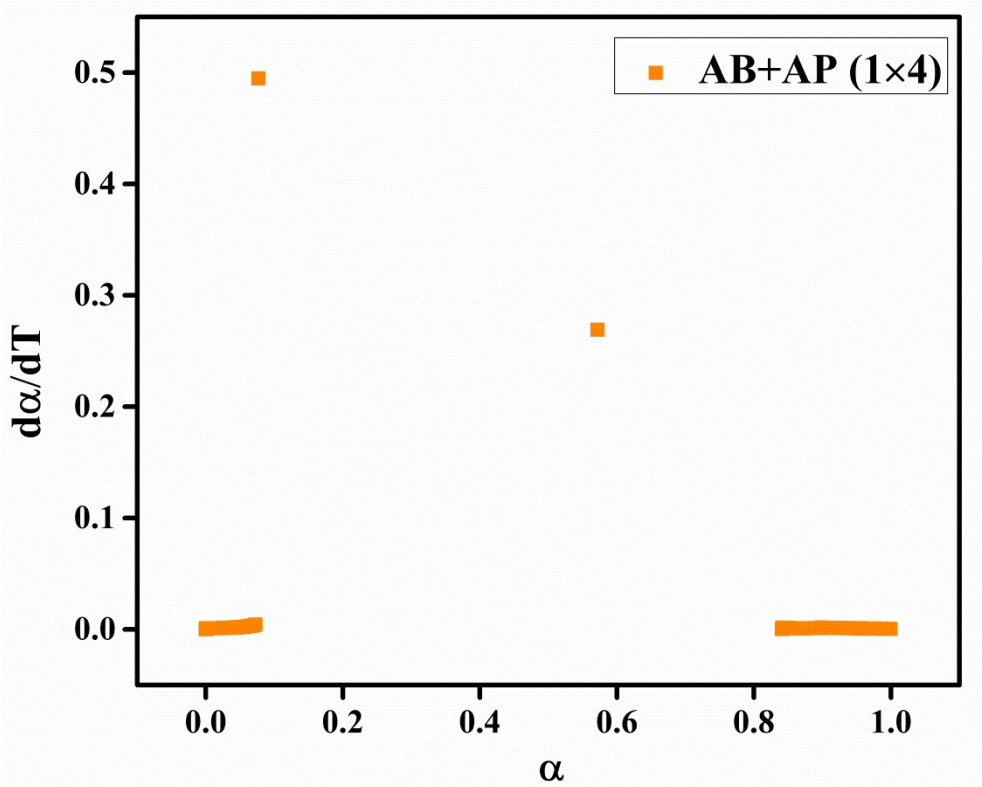


Figure S3: Kinetic data for AB+AP(1×4)@10 thermal decomposition

Table S4: Avrami Erofe'ev model fitting parameters

| | $n$ | $k$ | $Adj.\ R^2$ |
|---|---|---|---|
| Pure AB | 5±5.76 | 0.016±0.015 | 0.42 |
| AB+AP (1×1) | 4.67±0.58 | 0.044±0.00513 | 0.925 |
| AB+AP (1×4) | 2.308±0.156 | 0.059±0.0033 | 0.921 |

**References**

1. Xie, S., Song, Y. & Liu, Z. In situ high-pressure study of ammonia borane by Raman and IR spectroscopy. *Can. J. Chem.* **87,** 1235–1247 (2009).