ARTICLE

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Supplementary Information

High Yield Exfoliation of a Sub-Micron hexagonal Boron Nitride Using a Solvent Free Method

Diana Santiago, [b] Maricela Lizcano, [b] Sean P. McDarby, [a]
Ching-Cheh Hung, [c] and Baochau N. Nguyen*[a]

Table SI (002) peak position and (002) FWHM of $\mathbf{A_I}$-Cl and $\mathbf{A_I}$-F

	(002) Peak position	(002) FWHM
A – pristine *h*BN	26.707	0.378
$\mathbf{A_I}$-LiCl	26.571	0.483
$\mathbf{A_I}$-NaCl	26.667	0.461
$\mathbf{A_I}$-KCl	26.686	0.487
$\mathbf{A_I}$-LiF	26.457	0.469
$\mathbf{A_{I\text{-}H}}$-NaF	26.628	0.485
$\mathbf{A_{I\text{-}H}}$-KF	26.571	0.487

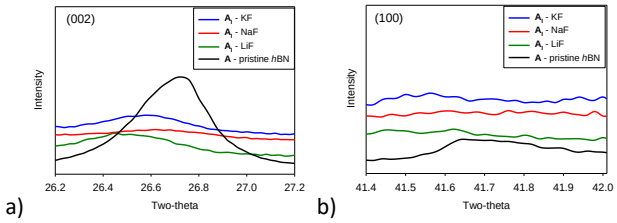

Figure S1 (a) and (b) XRD patterns of intercalated $\mathbf{A_I}$-F on both (002) and (100) planes, respectively, using fluoride salts as activation agents. Note that (002) plane of pristine *h*BN was scaled down for observation and comparison to the exfoliated $\mathbf{A_I}$-Cl.

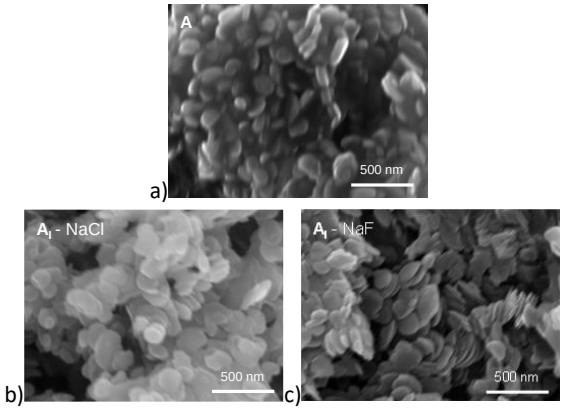

Figure S2 SEM images of (a) pristine *h*BN, (b) intercarlated $\mathbf{A_I}$ using NaCl and (c) intercalated $\mathbf{A_I}$ using NaF as activation agents.

[a.] *Universities Space Research Association, 425 3rd Street SW. Suite 950, Washington DC 20024. E-mail: Baochau.n.nguyen@nasa.gov; Tel: +1-216-433-2738*
[b.] *NASA Glenn Research Center, 21000 Brookpark Road, Cleveland, OH, 44135. E-mail: diana.santigao-dejesus@nasa.gov; Tel: +1-216-433-6068.*
[c.] *Boron Nitride Research and Engineering, LCC, Orlando, FL, 32827.*
**Corresponding author*

Table S2 (002) peak position and (002) FWHM of $\mathbf{A}_{\mathbf{I\text{-}H}}$-Cl and $\mathbf{A}_{\mathbf{I\text{-}H}}$-F

	(002) Peak position	(002) FWHM
A – pristine *h*BN	26.707	0.378
$\mathbf{A}_{\mathbf{I\text{-}H}}$-LiCl	26.707	0.389
$\mathbf{A}_{\mathbf{I\text{-}H}}$-NaCl	26.707	0.335
$\mathbf{A}_{\mathbf{I\text{-}H}}$-KCl	26.707	0.357
$\mathbf{A}_{\mathbf{I\text{-}H}}$-LiF	26.745	0.362
$\mathbf{A}_{\mathbf{I\text{-}H}}$-NaF	26.726	0.389
$\mathbf{A}_{\mathbf{I\text{-}H}}$-KF	26.707	0.386

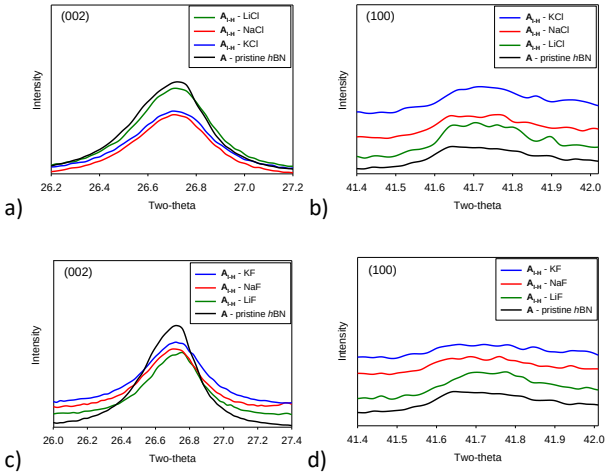

Figure S3 XRD patterns of a) (002) plane and b) (100) plane of exfoliated products, $\mathbf{A}_{\mathbf{I\text{-}H}}$-Cl, c) (002) plane and d) (100) plane of exfoliated products, $\mathbf{A}_{\mathbf{I\text{-}H}}$-F, respectively. Note that the intensity of (002) plane of pristine *h*BN was scaled down for observation and comparison to the exfoliated $\mathbf{A}_{\mathbf{E\text{-}H}}$-Cl.

Table S3 (002) peak position of $\mathbf{A}_{\mathbf{E\text{-}H}}$-Cl and $\mathbf{A}_{\mathbf{E\text{-}H}}$-F

	(002) Peak position
A – pristine *h*BN	26.707
$\mathbf{A}_{\mathbf{E}}$-LiCl	26.724
$\mathbf{A}_{\mathbf{E}}$-NaCl	26.707
$\mathbf{A}_{\mathbf{E}}$-KCl	26.688
$\mathbf{A}_{\mathbf{E}}$-LiF	26.745
$\mathbf{A}_{\mathbf{E}}$-NaF	26.707
$\mathbf{A}_{\mathbf{E}}$-KF	26.707

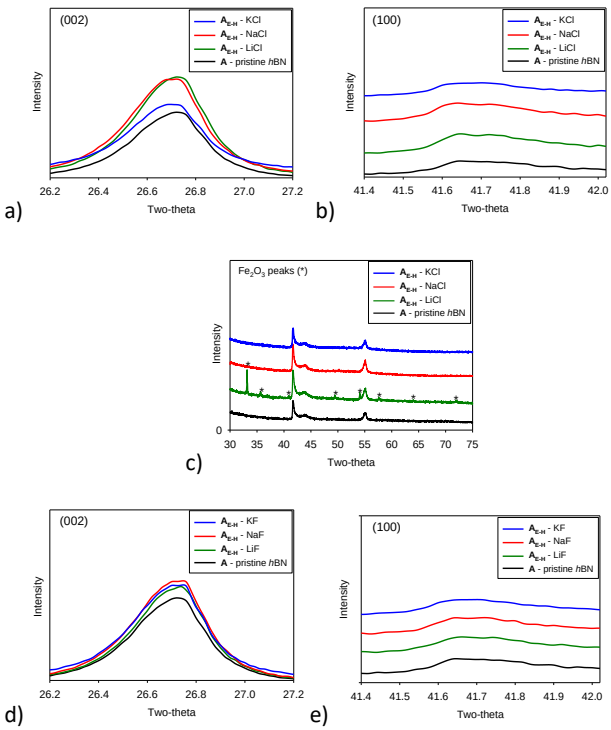

Figure S4 XRD patterns of a) (002) plane and b) (100) plane of exfoliated products, $\mathbf{A}_{\mathbf{E\text{-}H}}$-Cl, respectively, and c) XRD pattern of α-Fe_2O_3 (ICDD No.01-079-0007) detected in $\mathbf{A}_{\mathbf{E\text{-}H}}$-LiCl, d) (002) plane and e) (100) plane of exfoliated products, $\mathbf{A}_{\mathbf{E\text{-}H}}$-F, respectively. Note that the intensity of (002) plane of pristine *h*BN was scaled down for observation and comparison to the exfoliated $\mathbf{A}_{\mathbf{E\text{-}H}}$-Cl.

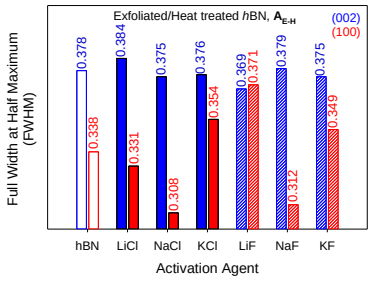

Figure S5 Full Width at Half Maximum (FWHM) of (002) and (100) planes of exfoliated/heat treated, $\mathbf{A}_{\mathbf{E\text{-}H}}$.

Table S4 % yield of $\mathbf{A}_{\mathbf{E\text{-}H}}$ with different activation agents

$\mathbf{A}_{\mathbf{E\text{-}H}}$	% Yield
$\mathbf{A}_{\mathbf{E\text{-}H}}$ -LiCl	>100
$\mathbf{A}_{\mathbf{E\text{-}H}}$-NaCl	>100
$\mathbf{A}_{\mathbf{E\text{-}H}}$-KCl	>100
$\mathbf{A}_{\mathbf{E\text{-}H}}$-LiF	93.0
$\mathbf{A}_{\mathbf{E\text{-}H}}$-NaF	83.6
$A_{E\text{-}H}$-KF	91.0

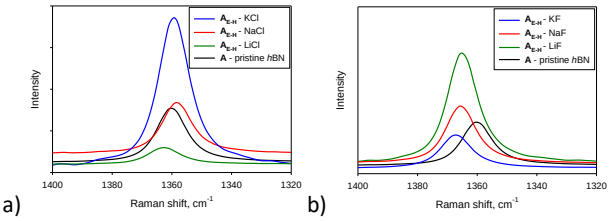

Figure S6 Raman spectroscopy of a) $\mathbf{A_{EH}}$-Cl and b) $\mathbf{A_{E\text{-}H}}$-F, compared to **A**.

Table S5 Raman peak shift, peak height and FWHM of $\mathbf{A_{EH}}$-Cl and $\mathbf{A_{E\text{-}H}}$-F

	Peak shift (cm^{-1})	Peak height	FWHM
A – pristine *h*BN	1360.2	2404	11.8
$\mathbf{A_{E\text{-}H}}$-LiCl	1362.8	723	13.6
$\mathbf{A_{E\text{-}H}}$-NaCl	1358.3	2242	11.9
$\mathbf{A_{E\text{-}H}}$-KCl	1359.3	6541	12.1
$\mathbf{A_{E\text{-}H}}$-LiF	1365.1	5986	13.5
$\mathbf{A_{E\text{-}H}}$-NaF	1365.5	3071	11.0
$\mathbf{A_{E\text{-}H}}$-KF	1367.2	1725	10.7