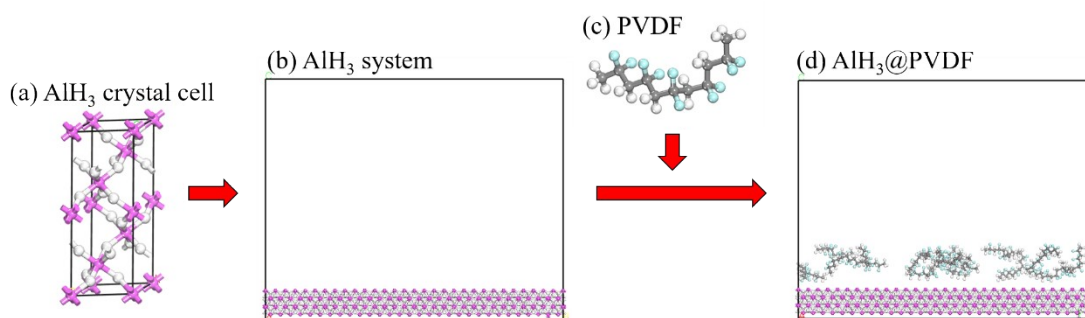


## Supporting information

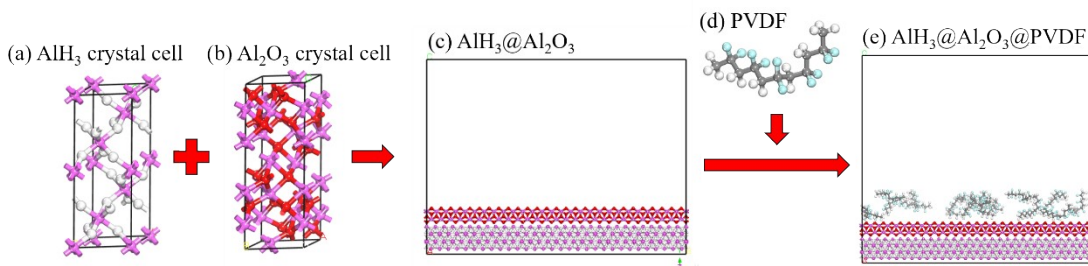
### Reactivity and stabilization mechanisms of $\text{AlH}_3$ crystals by coating of polyvinylidene difluoride

Yiran Zhang, Haorui Zhang, Minghui Yu, Qi-Long Yan\*

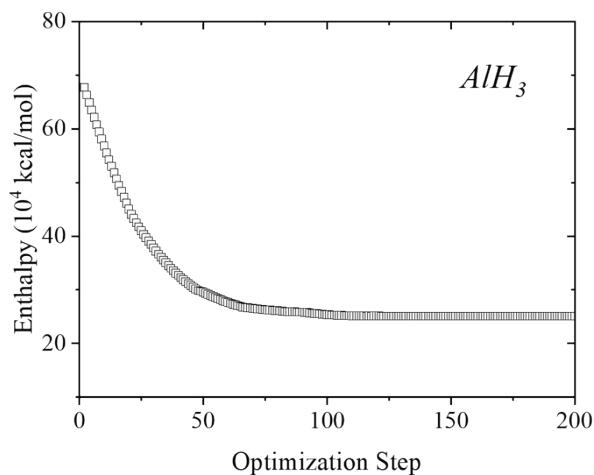
National Key Laboratory of Solid Rocket Propulsion, Northwestern Polytechnical University, Xi'an 710072, China



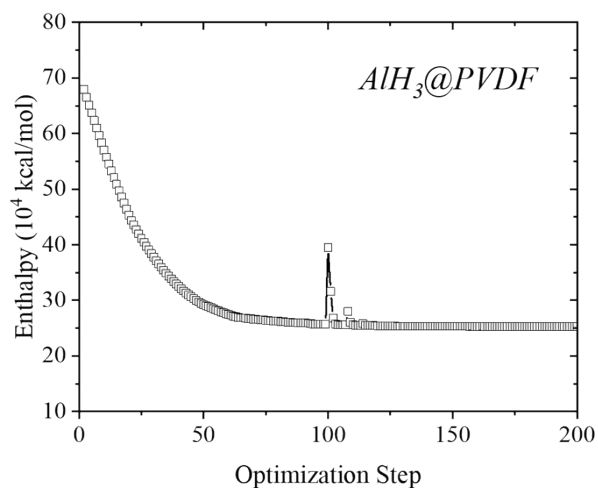
Figs. S1. Detailed building process of  $\text{AlH}_3@PVDF$



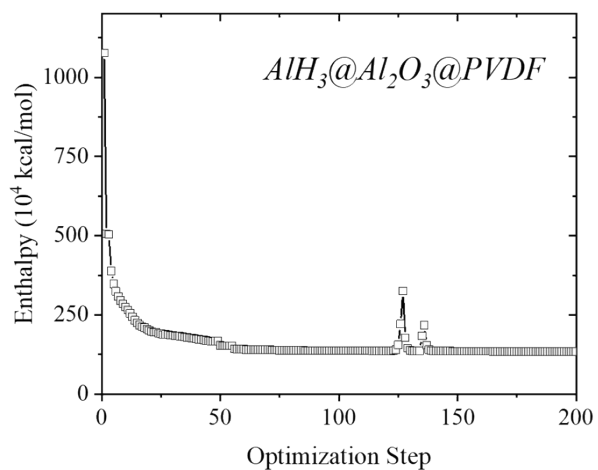
Figs. S2. Detailed building process of  $\text{AlH}_3@Al_2O_3@PVDF$



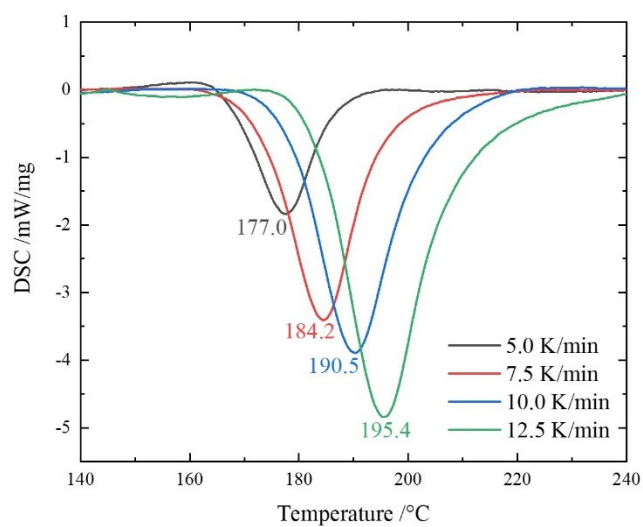
Figs. S3. Energy change of the  $\text{AlH}_3$  system during relaxation



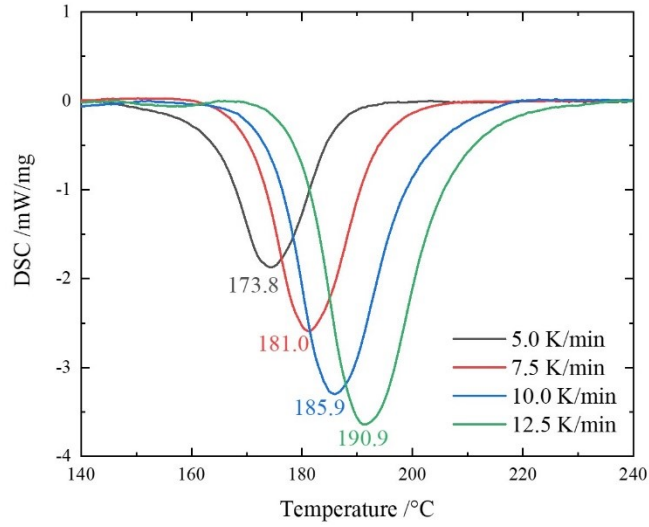
Figs. S4. Energy change of the  $\text{AlH}_3@PVDF$  system during relaxation



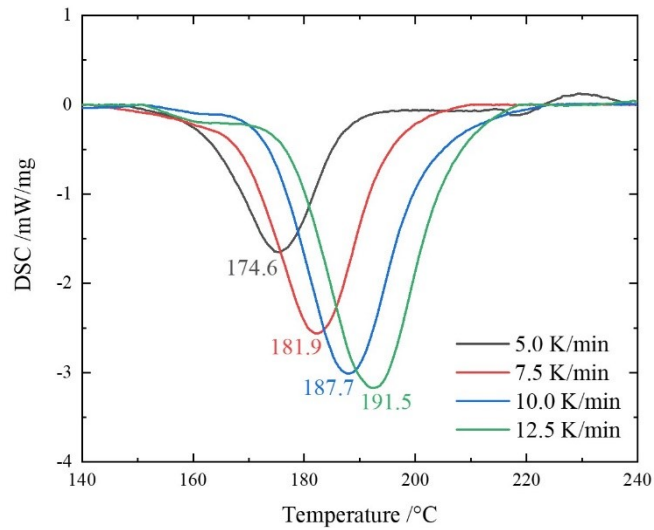
Figs. S5. Energy change of the  $\text{AlH}_3@Al_2O_3@PVDF$  system during relaxation



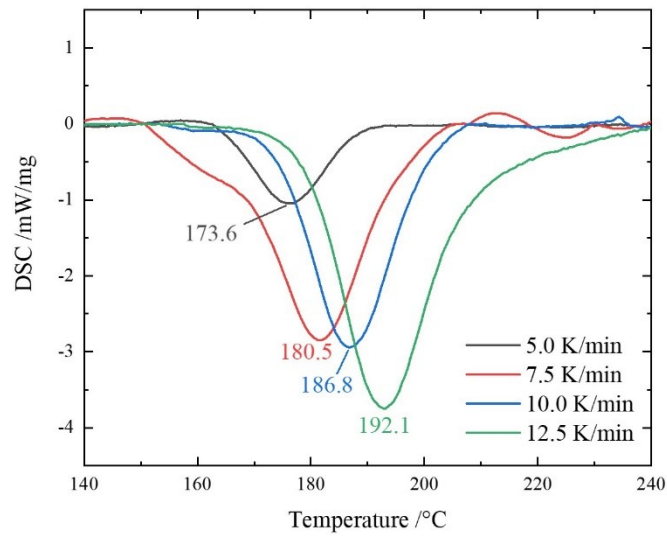
Figs. S6. DSC curves of  $\text{AlH}_3$



Figs. S7. DSC curves of AF-08



Figs. S8. DSC curves of AF-15



Figs. S9. DSC curves of AF-20

Table S1. Detailed DSC data for AlH<sub>3</sub> and composites.

Samples	<i>R</i>	<i>T<sub>i</sub></i>	<i>T<sub>p</sub></i>	$\Delta H$
AlH <sub>3</sub>	5.0	167.8	177.0	313.7
	7.5	173.5	184.2	393.8
	10.0	179.1	190.5	370.8
	12.5	183.9	195.4	301.5
AF-08	5.0	165.3	173.8	313.1
	7.5	171.3	181.0	322.9
	10.0	176.2	185.9	312.6
	12.5	180.1	190.9	285.0
AF-15	5.0	163.6	174.6	298.3
	7.5	169.5	181.9	318.8
	10.0	174.1	187.7	296.2
	12.5	178.1	191.5	244.5
AF-20	5.0	167.2	173.6	191.0
	7.5	180.5	180.5	278.2
	10.0	176.1	186.8	275.4
	12.5	179.5	192.1	256.9

Notes: *R*, the heating rate, in °C min<sup>-1</sup>; *T<sub>i</sub>*, the onset temperature, in °C; *T<sub>p</sub>*, the peak temperature, in °C;  $\Delta H$ , heat absorption, in J g<sup>-1</sup>.