

## Supplementary Information

### Ultra-narrow Blue Phosphorene Nanoribbons for Tunable Optoelectronics

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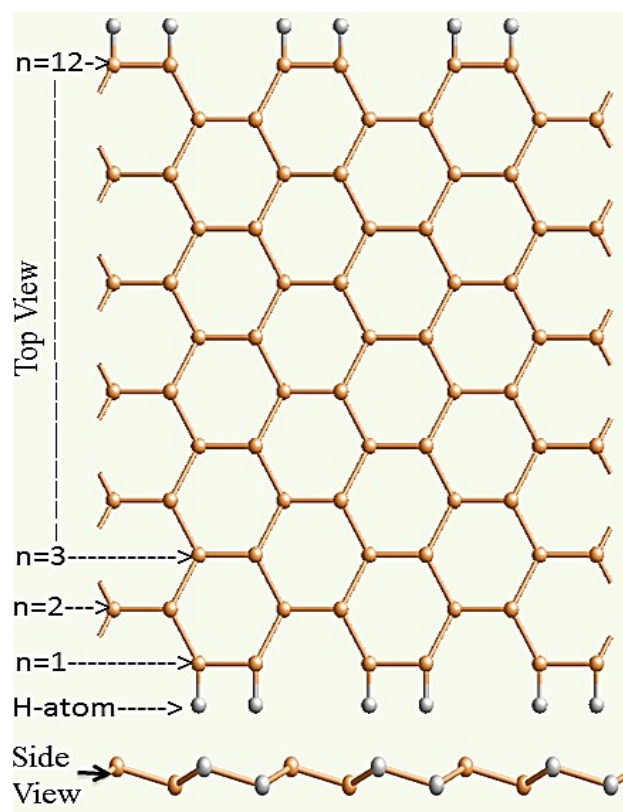
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125001*

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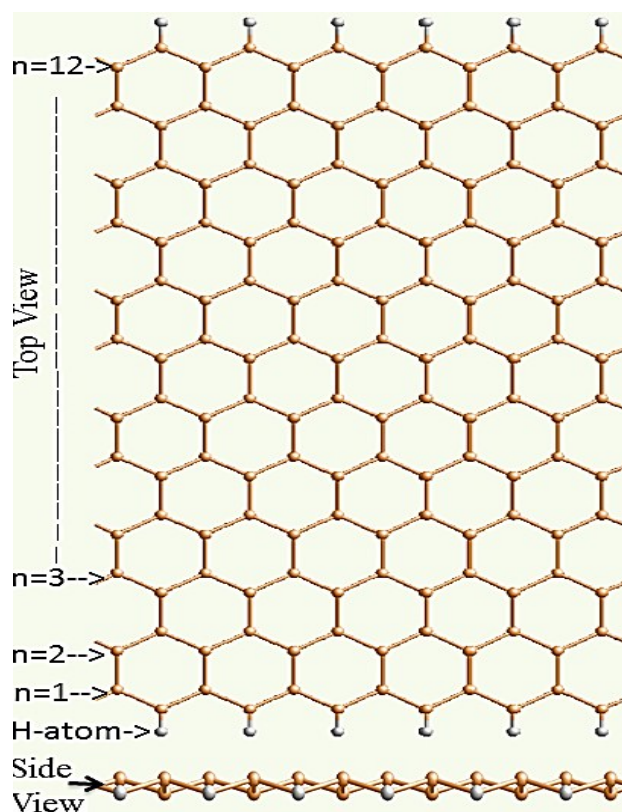
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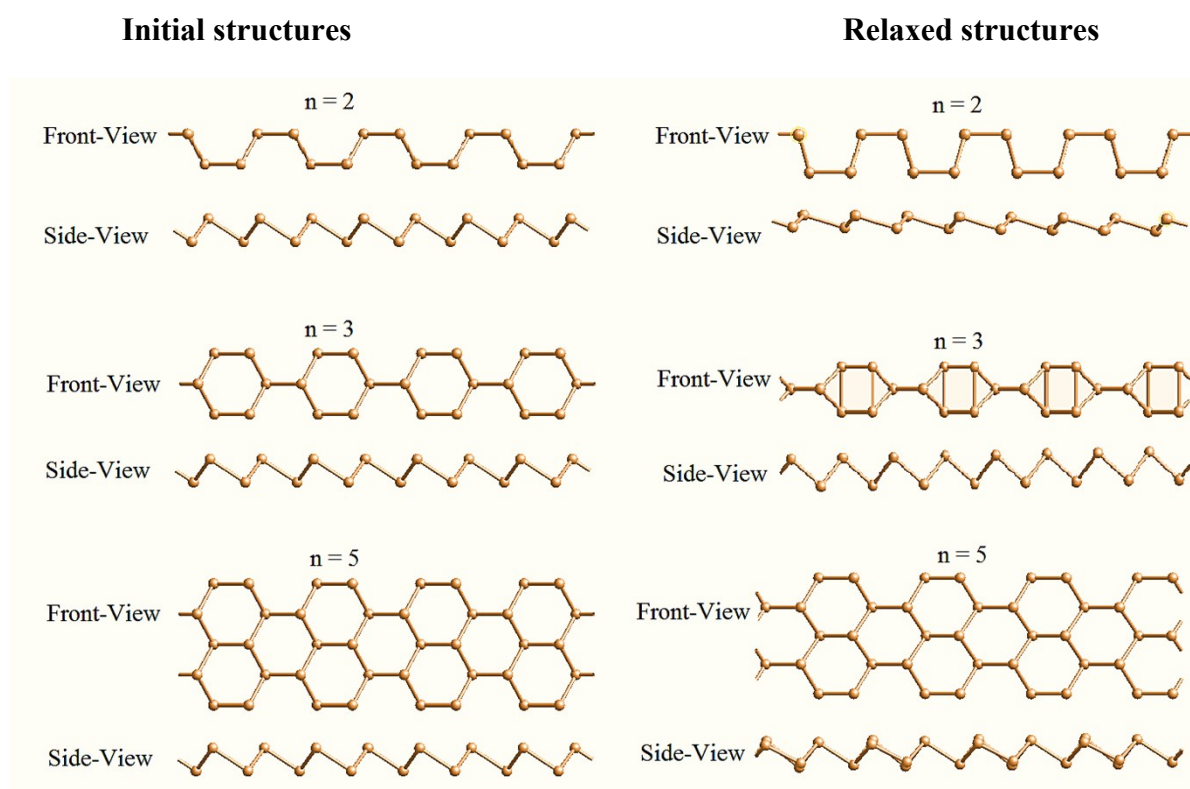
**H-ABPNR**



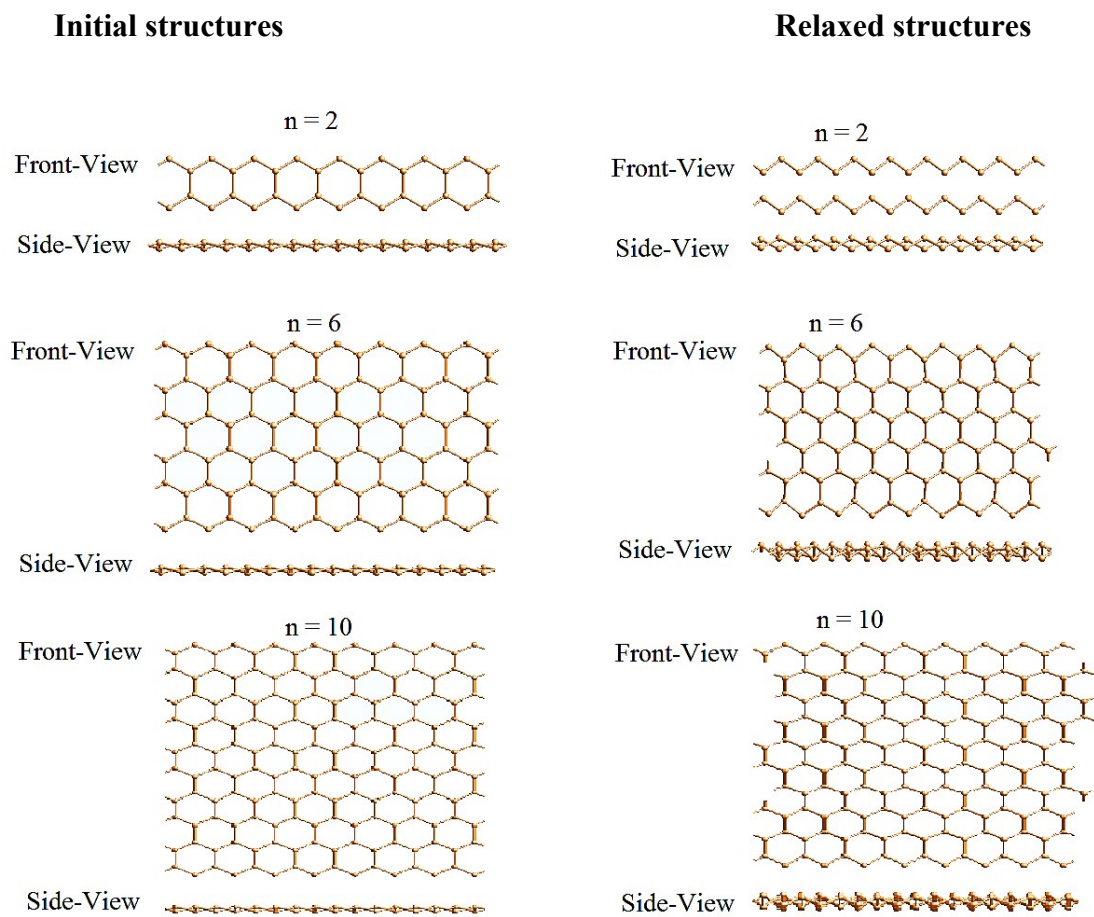
**H-ZBPNR**



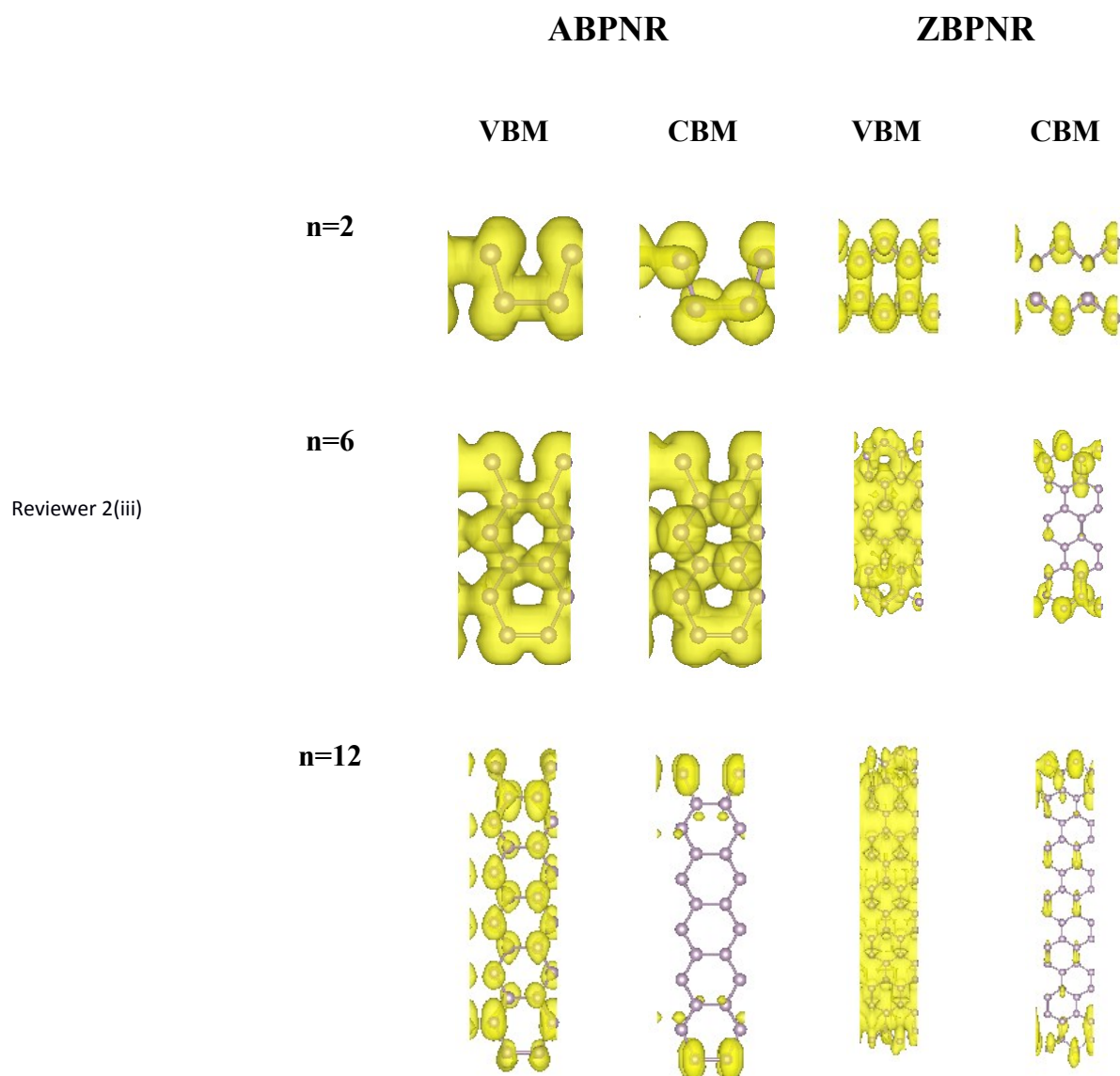
**Figure S1:** Top and Side view of H-ABPNR and H- ZBPNR for the widest ribbon (n=12) considered in the study.



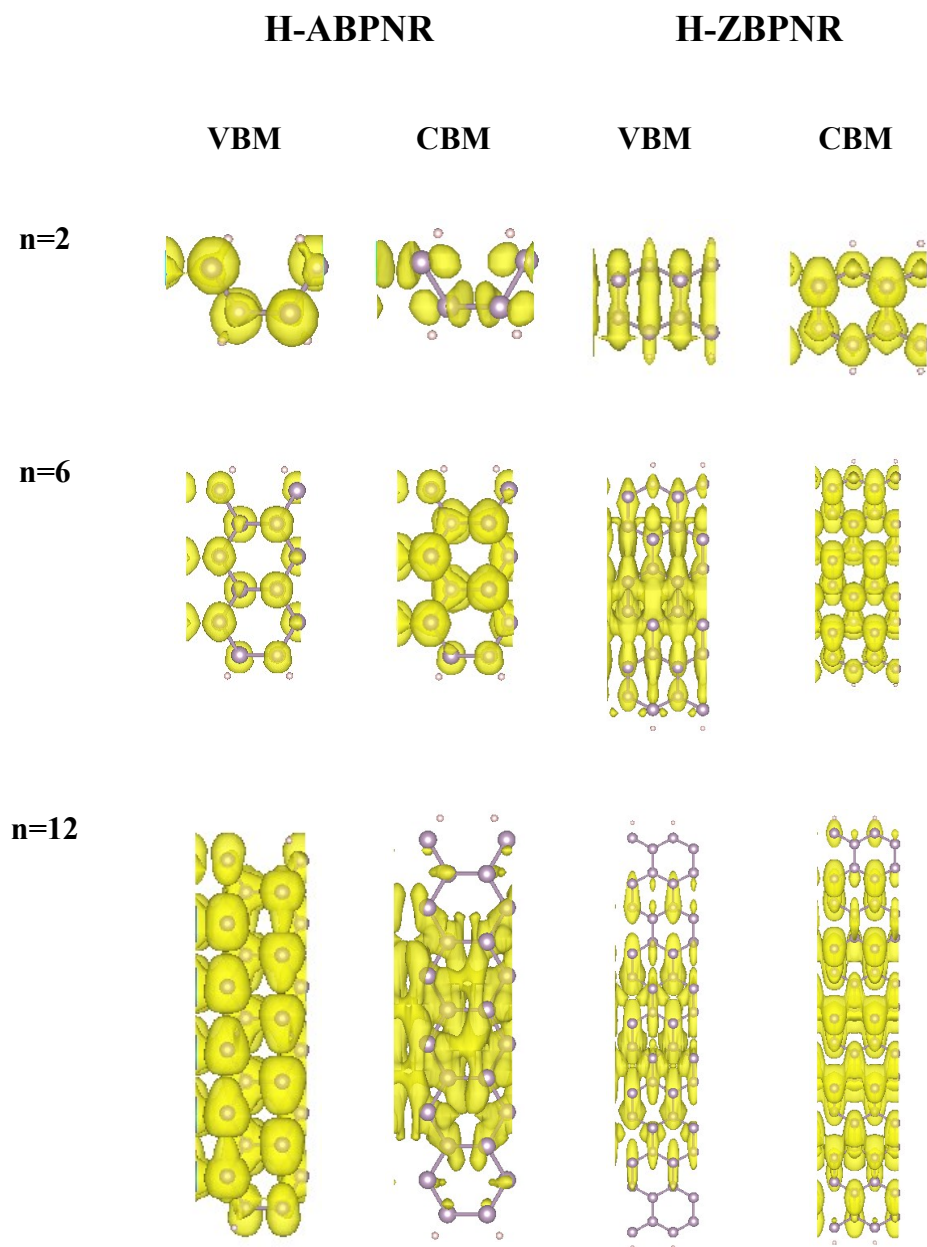
**Figure S2:** Initial and fully relaxed structures of ABPNR at width  $n = 2, 3, 5$ . The reconstruction of edge atoms can be seen in relaxed structures.



**Figure S3:** Initial and fully relaxed structures of ZBPNR at width  $n = 2, 3, 5$ . The reconstruction of edge atoms can be seen in relaxed structures.



**Figure S4:** Valance band maxumum (VBM) and conduction band minimum (CBM) charge density for width  $n=2, 6$  and  $12$  of bare BPNRs. The iosurface value is set at  $10^{-3} \text{ e}/\text{\AA}^3$ .



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**Figure S5:** Valance band maxumum (VBM) and conduction band minimum (CBM) charge density for width  $n=2, 6$  and  $12$  of passivated BPNRs. The iosurface value is set at  $10^{-7} \text{ e}/\text{\AA}^3$ .

**Table T1:** Plasmonic energy (eV) of  $\pi+\sigma$  structure peak for smallest width (n=2) and widest width (n=12) BPNRs. The plasmonic energy at 2% and at ultimate tensile strength (UTS) of widest width BPNR is also given.

	$\pi+\sigma$ plasmonic energy (eV)			
	<b>n=2</b>	<b>n=12</b>	<b>2%</b>	<b>at UTS</b>
<b>ABPNR</b>	5.8	8.4	8.3	6.3
<b>H-ABPNR</b>	6.8	8.8	8.6	6.5
<b>ZBPNR</b>	6.0	8.6	8.4	6.4
<b>H-ZBPNR</b>	6.3	8.5	8.2	6.3