

Supporting Information

Discotic Liquid Crystals as Novel Corrosion-Resistant Coatings

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General methods

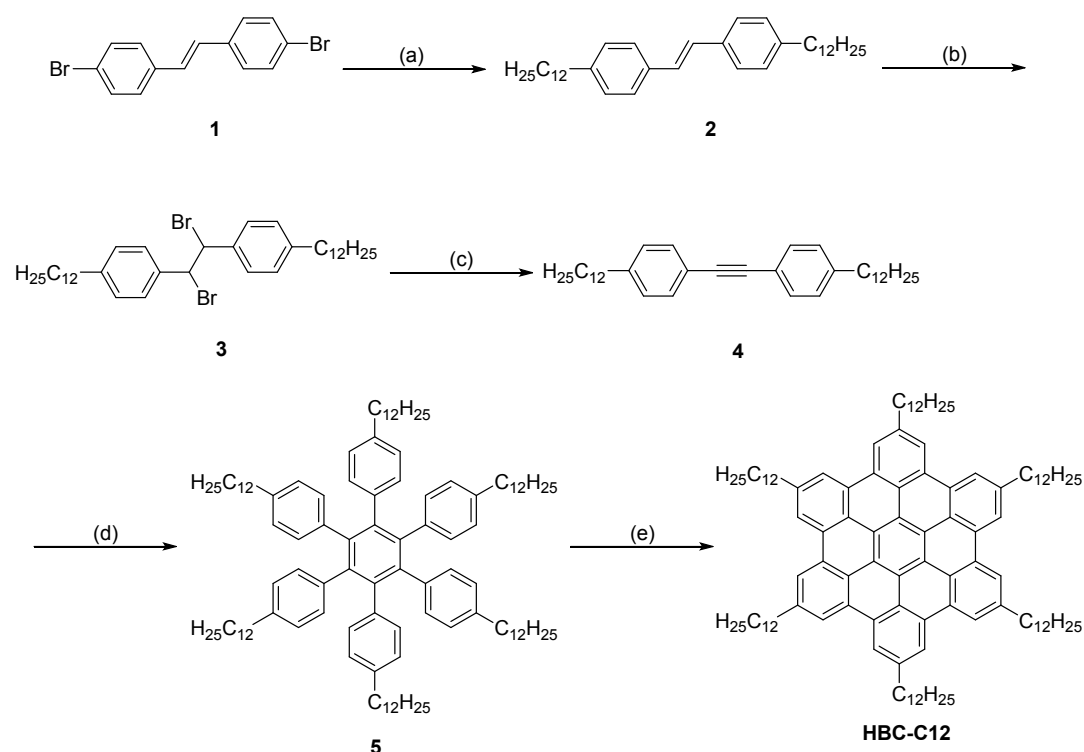
Experimental

All commercially available chemicals were used without further purification and solvents were carefully dried and distilled prior to use. All glassware was previously heat-dried under vacuum with a hot air gun before use. Reactions were performed under an inert atmosphere. Column chromatography was performed on Geduran Silica 60 (40-63 μm , Merck). ^1H NMR spectra were recorded at 400 MHz on Bruker spectrometers in CDCl_3 experimental and ^{13}C NMR spectra were recorded at 100 MHz on the same spectrometer.

Synthesis of HBC-C12

All compounds were synthesized according to the same procedure reported for the preparation of **HBC-C12**.¹⁻³

^1H NMR ($\text{CDCl}_3+\text{CS}_2$, 400 MHz): $\delta = 8.36$ (s, 12H; -ArH-), 3.01-2.97 (m, 12H, - CH_2 -), 2.00-1.96 (m, 12H; - CH_2 -), 1.63-1.25 (m, 108H; - CH_2 -), 0.89-0.86 (t, 18H; - CH_3). ^{13}C NMR ($\text{CDCl}_3+\text{CS}_2$, 100 MHz): $\delta = 139.3$, 129.2, 122.7, 120.6, 118.9, 37.2, 32.5, 32.0, 30.0, 22.7, 14.1.



Scheme S1. Synthesis of **HBC-C12**. (a) $\text{Pd}(\text{dppf})\text{Cl}_2$, $\text{C}_{12}\text{H}_{25}\text{MgBr}$, THF, reflux, 98%; (b) Br_2 , CHCl_3 , rt, 64%; (c) $t\text{-BuOH}$, $t\text{-BuOK}$, reflux, 87%; (d) $\text{Co}(\text{CO})_8$, 1,4-dioxane, reflux, 66%; (e) FeCl_3 , $\text{CH}_3\text{NO}_2/\text{CHCl}_2$, rt, 91%.

Scheme S1. The synthesis methods of **HBC-C12**.

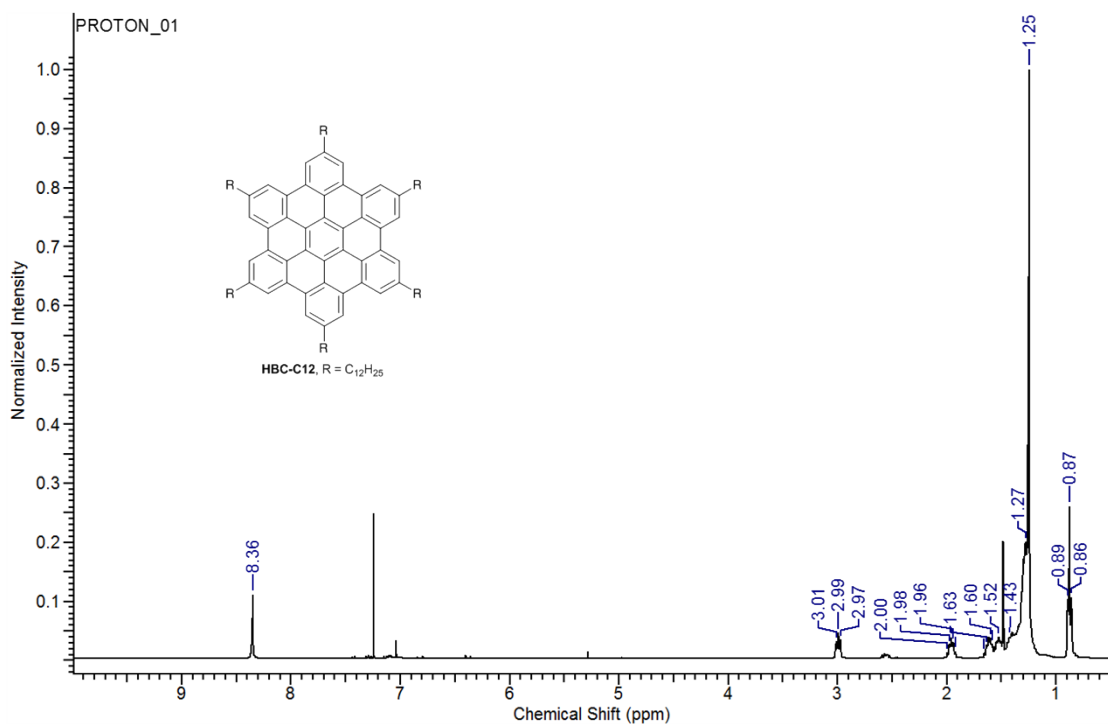


Fig. S2 ¹H NMR spectrum (400 MHz, CDCl₃+CS₂) of **HBC-C12**.

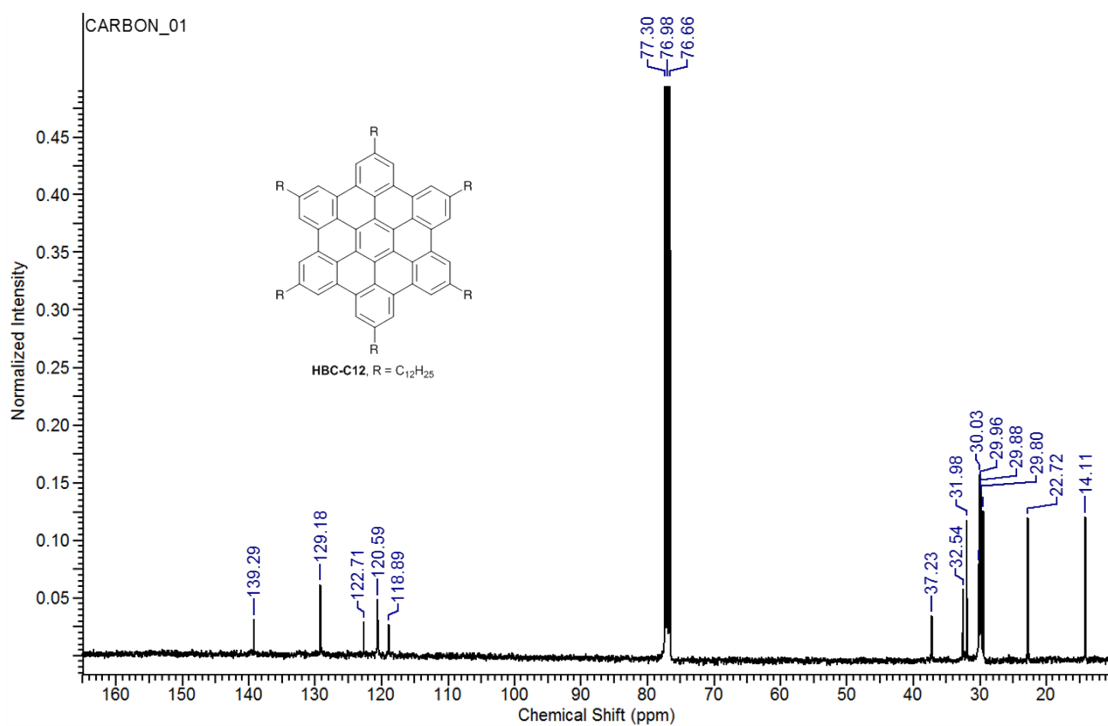


Fig. S3 ¹³C NMR spectrum (100 MHz, CDCl₃+CS₂) of **HBC-C12**.

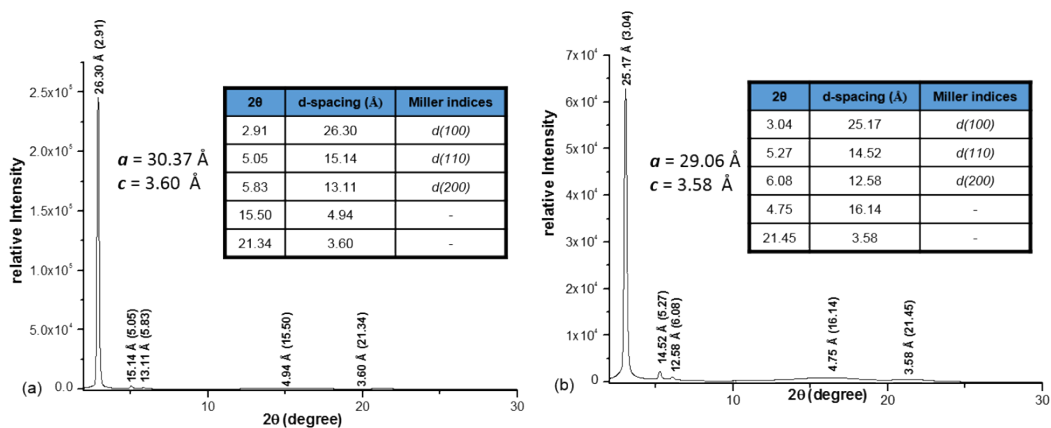


Fig. S4 powder X-ray diffractogram of **HBC-C12** in the columnar phase on cooling at (a) 200 °C and (b) rt.

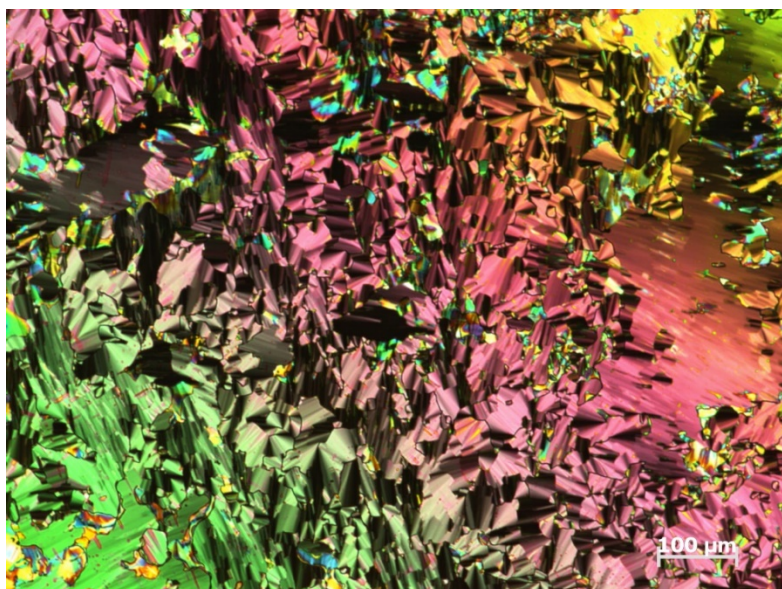


Fig. S5 Optical micrograph of **HBC-C12** at 120 °C sandwiched between glass slides showing pseudo focal conic texture between cross polarisers.

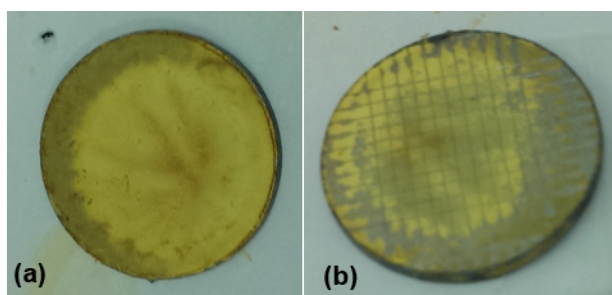


Fig. S6 The cross-cut test for DLC-coating on iron plate

References

- 1 S. Bance, H. J. Barber and A. M. Woolman, *J. Chem. Soc.*, 1943, 1.
- 2 A. Fechtenkötter, N. Tchebotareva, M. Watson and K. Müllen, *Tetrahedron*, 2001, **57**, 3769-3783.
- 3 S. Ito, M. Wehmeier, J. D. Brand, C. Kübel, R. Epsch, J. P. Rabe and K. Müllen, *Chem. Eur. J.*, 2000, **6**, 4327-4342.