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# Triptycene dimethyl-bridgehead dianhydride-based intrinsically microporous hydroxyl-functionalized polyimide for natural gas upgrading

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**Abstract**

The synthesis and gas permeation properties of a high-performance hydroxyl-functionalized PIM-polyimide (TDA1-APAF) prepared from a novel 9,10-dimethyl-2,3,6,7-triptycene tetracarboxylic dianhydride (TDA1) and a commercially available 2,2-bis(3-amino-4-hydroxyphenyl)-hexafluoropropane (APAF) diamine monomer are reported. The microporous polymer had a BET surface area based on nitrogen adsorption of 260 $m^2 g^{-1}$. A freshly prepared sample exhibited excellent gas permeation properties: (i) $CO_2$ permeability of 40 Barrer coupled