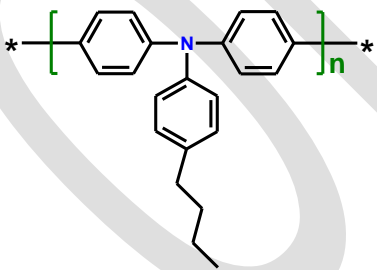


CERTIFICATE OF ANALYSIS

IM Material:	PE0299 / PH0299, Poly-TPD
Chemical name:	Poly(4-butylphenyl-diphenyl-amine)
CAS No.:	472960-35-3
Chemical Structure:	
Lot number:	SX8121A
Appearance:	Beige fiber-like short treads
NMR:	Structure confirmed
Assay:	99+% (basing on trace metal analysis)
Molecular weight (GPC):	~50,000 (Mw, PS Standard)
PDI:	~2.5
Solubility:	Soluble in THF, CHCl ₃ , other selected solvents
HOMO/LUMO	HOMO 5.2 eV LUMO 2.3 eV [reference data]
Applications:	Hole transport materials for OPV, perovskite solar cell, OPC and other organic electronic applications