2-Cyanoethyl tetraisopropylphosphorodiamidite

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ESSENTIAL CHEMISTRY

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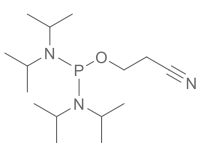
Introduction

Phosphorodiamidites are a unique class of phosphorus-based compounds characterized by one P–O bond and two P–N moieties. 2-Cyanoethyl tetraisopropylphosphorodiamidite plays a crucial role in solid-phase oligonucleotide synthesis. Beyond their application as synthetic precursors for oligonucleotides, phosphorodiamidites have also been reported as valuable starting materials for the synthesis of industrially relevant polymers and flame-resistant materials, including adhesives, coatings, and laminates.

Manufacture

Cyanoethanol is treated with excess PCl_3 to form the corresponding alkoxydichlorophosphine intermediate, which is subsequently reacted with diisopropylamine to yield 2-cyanoethyl tetraisopropylphosphorodiamidite. Alternatively, 3-trimethylsilanyloxypropionitrile can be reacted with PCl_3, followed by treatment with diisopropylamine, to obtain 2-cyanoethyl tetraisopropylphosphorodiamidite in good yields.

Synonyms	Bis(diisopropylamino)(2-cyanoethoxy)phosphine
CAS no.	102691-36-1
EINECS no.	600-337-9
Molecular formula	$C_{15}H_{32}N_3OP$
Molecular weight	301.41
Structure	

Applications

The main areas of applications of 2-Cyanoethyl tetraisopropylphosphorodiamidite include:

- **Solid-phase oligonucleotide synthesis:** Widely used as a key phosphitylating reagent in automated DNA and RNA synthesis, enabling efficient formation of phosphite triester intermediates.
- **Synthesis of modified oligonucleotides:** Applied in the preparation of antisense oligonucleotides, siRNA, aptamers, and other therapeutic nucleic acid analogues.
- **Precursor for P-containing intermediates:** Serves as an important building block in the synthesis of phosphoramidite and phosphite derivatives used in fine chemicals and specialty reagents..
- **Polymer and materials chemistry:** Reported as a starting material or intermediate for the preparation of phosphorus-containing polymers..
- **Flame-retardant materials:** Utilized in the development of flame-resistant adhesives, coatings, and laminating materials due to the presence of phosphorus functionality..

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SPECIFICATIONS

Test	Unit	Specification
Appearance	-	Clear liquid
Identification by NMR	-	Should conform to the structure
Impurities between 181.5-178.6 ppm	%	NMT 0.1
Impurities between 151.2-148 ppm	%	NMT 0.1
Impurities between 121.7-100 ppm	%	NMT 0.2
Impurities < 66.0 ppm	%	NMT 2.0
Impurities between 113-114 ppm	%	NMT 0.0040
Sum of Impurities between 120-148 ppm	%	NMT 0.5
Purity (By ^{31}P NMR)	Area%	NLT 98.0

STORAGE & PRECAUTION
Keep sealed at room temperature

PACKING
Globally compliant packaging

REACH Status
REACH registered (https://echa.europa.eu/substance-information/-/substanceinfo/100.107.517)

ExSyn offers 2-Cyanoethyl tetraisopropylphosphorodiamidite on commercial scales and welcomes enquiries. Our exceptional quality and service will make ExSyn your supplier of choice! If you need any additional information or SDS, please contact us.