Sulfur Heterocycles

Sulfur heterocyclic compounds are formed when a carbon atom in a carbocyclic ring is replaced by sulfur. They may be alicyclic or aromatic in nature. The heterocyclic ring may contain one or more sulfur atoms which influence the physio-chemical and biological properties of the compounds. Fragmentation of sulfur containing heterocycles almost always proceeds with the loss of sulfur atoms or sulfur containing fragments.

The presence of sulfur heteroatoms results in significant changes in the cyclic molecular structure due to the availability of unshared pairs of electrons and the difference in electronegativity between heteroatoms and carbon. As a result these heterocycles are considered as promising materials in different areas of pharmaceutical and agrochemical research, and also more recently as compounds with interesting physical properties for magnetism and conductivity. Sulfur heterocycles are common constituents of petroleum and liquids derived from coal, and they are found in some secondary metabolites of microorganisms and plants. For example, the microbially produced penicillins and cephalosporins have sulfur containing rings.

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L19559	1,1-Dioxobenzo[b]thiophen-2-ylmethyl chloroformate, tech. 90%
H52240	1,3-Dihydrobenzo[c]thiophene-5-thiocarboxamide, 97%
B20967	2-Acetyl-3-methylbenzo[b]thiophene, 97%
B21173	2-Acetylbenzo[b]thiophene, 98%
H34245	2-Amino-4,5,6,7-tetrahydrobenzo[b]thiophene-3-carboxamide, 96%
H34215	2-Amino-6-methyl-4,5,6,7-tetrahydrobenzo[b]thiophene-3-carboxamide, 96%
B20250	2-Bromo-5-chloro-3-methylbenzo(b)thiophene, 97%
H64645	2-Bromodibenzothiophene, 98%
H52054	3-(3-Benzothienyl)-N-Fmoc-L-alanine, 95%
B20768	3,5-Dimethylbenzo[b]thiophene, 97%
H50420	3,6-Dichlorobenzo[b]thiophene-2-carbonyl chloride, 95%
H50422	3-Chloro-6-fluorobenzo[b]thiophene-2-carbonyl chloride, 98%
H50419	3-Chloro-6-methoxybenzo[b]thiophene-2-carbonyl chloride
H50423	3-Chloro-6-methylbenzo[b]thiophene-2-carbonyl chloride
L11745	3-Chlorobenzo[b]thiophene-2-carbonyl chloride, 95%
L18898	3-Chlorobenzo[b]thiophene-2-carboxamide, 98%
L01257	3-Chlorobenzo[b]thiophene-2-carboxylic acid, 97%
A19620	3-Methylbenzo[b]thiophene-2-acetic acid, 97%

A11375	3-Methylbenzo[b]thiophene-2-carboxaldehyde, 98%
B24624	3-Methylbenzo[b]thiophene-2-carboxylic acid, 97%
A15772	3-Methylbenzo[b]thiophene, 98%
H33062	4,5,6,7-Tetrahydrobenzo[b]thiophene-2-carboxylic acid, 97%
H34470	4,5,6,7-Tetrahydrobenzo[b]thiophene-2-sulfonyl chloride, 95%
H58548	4,5,6,7-Tetrahydrobenzo[b]thiophene-3-carboxylic acid, 97%
H34309	4,5,6,7-Tetrahydrobenzo[b]thiophene, 97%
H66003	4,6-Dibromodibenzothiophene, 96%
H55472	4,6-Dimethyldibenzothiophene, 97%
H33015	4-Chlorobenzo[b]thiophene-2-carboxylic acid, 97%
L20133	5-Bromobenzo[b]thiophene, 98+%
A11827	5-Chloro-3-methylbenzo[b]thiophene, 97%
L12836	5-Chlorobenzo[b]thiophene-3-acetic acid, 97%
A10762	5-Chlorobenzo[b]thiophene-3-acetonitrile, 97%
H61748	5-Chlorobenzo[b]thiophene, 97%
H33239	5-Fluorobenzo[b]thiophene-2-carboxylic acid, 96%
A12666	5-Methylbenzo[b]thiophene, 97%
H60220	6,7-Dihydrobenzo[b]thiophen-4-one, 98%

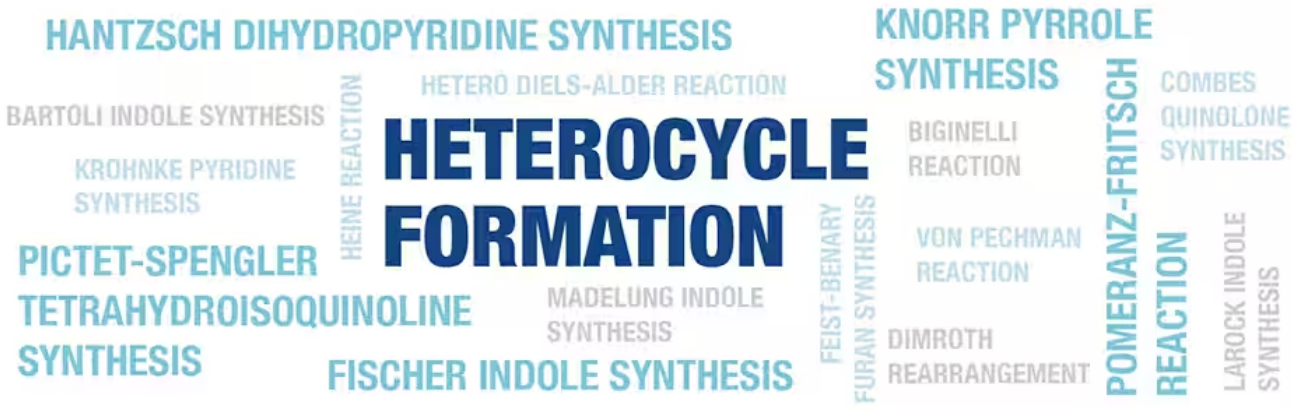
A14063	Benzo[b]thiophene 1,1-dioxide, 98%
B22835	Benzo[b]thiophene-2-boronic acid, 97%
L08140	Benzo[b]thiophene-2-carbonyl chloride, 98%
L19345	Benzo[b]thiophene-2-carboxaldehyde, 97%
A12292	Benzo[b]thiophene-2-carboxamide, 97%
A12471	Benzo[b]thiophene-2-carboxylic acid, 98%
H27512	Benzo[b]thiophene-2-methanol, 97%
L05855	Benzo[b]thiophene-3-acetic acid, 98+%
L08547	Benzo[b]thiophene-3-acetonitrile, 98+%
H51876	Benzo[b]thiophene-3-boronic acid pinacol ester, 95%
H50105	Benzo[b]thiophene-3-carboxylic acid, 96%
H61368	Benzo[b]thiophene-3-sulfonyl chloride, 97%
A12328	Benzo[b]thiophene, 98+%
H64816	Dibenzothiophene-2-boronic acid, 97%

L19831	Dibenzothiophene-4-boronic acid, 95%
A12288	Dibenzothiophene, 98%
H34197	Ethyl 2-amino-4,5,6,7-tetrahydrobenzo[b]thiophene-3-carboxylate, 98%
H33760	Ethyl 2-amino-6-methyl-4,5,6,7-tetrahydrobenzo[b]thiophene-3-carboxylate, 96%
H34050	Ethyl 3-aminobenzo[b]thiophene-2-carboxylate, 97%
H34167	Ethyl 5-fluorobenzo[b]thiophene-2-carboxylate, 96%
H36992	Methyl 3,4-dichlorobenzo[b]thiophene-2-carboxylate, 97%
H33956	Methyl 3-aminobenzo[b]thiophene-2-carboxylate, 97%
H37805	Methyl 3-chloro-4-fluorobenzo[b]thiophene-2-carboxylate, 98%
L10696	Methyl 3-chlorobenzo[b]thiophene-2-carboxylate, 95%
B24069	Methyl 3-methylbenzo[b]thiophene-2-carboxylate, 97%
H36325	Methyl 7-bromo-3-chloro-4-fluorobenzo[b]thiophene-2-carboxylate, 97%
A13769	Methyl benzo[b]thiophene-2-carboxylate, 98%

Condensed Thiophenes

Sulfur is present in various forms and functionally these forms are categorized as thiol, disulfide, sulfide and thiophene. Condensed thiophenes are the most abundant in various fossil fuels due to their resonance stabilities. Condensed thiophenes are alternatively referred to as polycyclic aromatic sulfur heterocycles (PASH). Linearly condensed thiophenes have a characteristic aggregation behavior, as they are hydrogen-poor pi compounds, and have a larger polarization energy than predicted by packing density and molecular polarizability calculations. Condensed thiophenes form inclusion compounds containing DMSO whose conformation is dependent on whether the number of condensed thiophene rings is odd or even.

Condensed thiophene derivatives and polythiophenes have received much attention as potential conducting polymers, electron acceptors, hydrogen-poor heterocycles, organic conductors and superconductors, photosensitive receptors, and materials for non-linear optics. Some of the examples of condensed thiophenes include thieno[2,3-b]thiophenes, which are structurally related to isoelectronic naphthalene and thienopyrimidines, which are in turn well known bioisosteres of quinazolines. Condensed thiophene derivatives, depending on the nature of the substituent, are potentially useful as antiviral, antibiotic, antiglaucoma, analgesic, antipyretic, and CNS drugs.



H32059	2-Amino-5,6-dihydro-4H-cyclopenta[b]thiophene-3-carbonitrile
H33671	2-Chloro-N-(3-cyano-5,6,7,8-tetrahydro-4H-cyclohepta[b]thiophen-2-yl)acetamide, 96%
H33934	2-Chloro-N-(3-cyano-5,6-dihydro-4H-cyclopenta[b]thiophen-2-yl)acetamide, 96%
H33881	2-Mercapto-3-phenyl-3,5,6,7-tetrahydro-4H-cyclopenta[b]thieno[2,3-d]pyrimidin-4-one, 96%
H56533	3,4-Ethylenedioxythiophene, 97%
H58017	3-Methylthieno[4,5-d]pyrimidin-4(3H)-one, 97%
H33260	4-Chloro-5-(4-chlorophenyl)thieno[2,3-d]pyrimidine, 96%
H33770	4-Chloro-5,6-dimethylthieno[2,3-d]pyrimidine, 96%
H34082	4-Chloro-5-(p-tolyl)thieno[2,3-d]pyrimidine, 96%
H58200	4H-Thieno[3,2-b]pyrrole-5-carboxylic acid, 97%
H58560	5-(2-Furyl)thieno[2,3-d]pyrimidin-4(3H)-one, 97%
H58812	5-(5-Methyl-2-furyl)thieno[2,3-d]pyrimidin-4(3H)-one, 97%
H58856	5-(5-Methyl-2-thienyl)thieno[2,3-d]pyrimidin-4-one, 97%
H33684	5,6,7,8-Tetrahydrobenzo[b]thieno[2,3-d]pyrimidine-4(3H)-thione, 96%

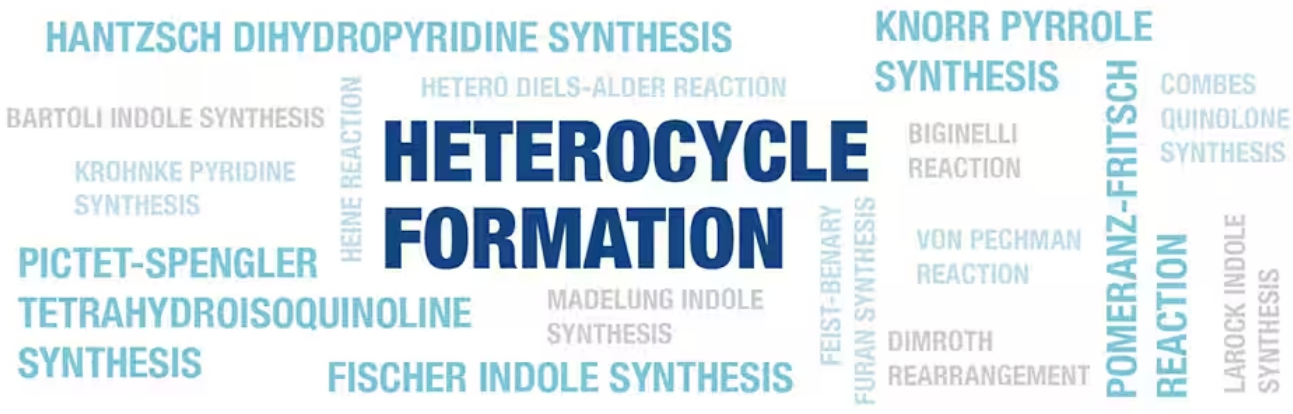
	H61654	5,6-Dimethylthieno[2,3-d]pyrimidin-4(3H)-one, 97%
	H59681	5,8-Dibromo-1,2,4-triazolo[1,5-a]pyrazine, 95%
	H52209	5-Phenylthieno[2,3-d]pyrimidin-4-one, 97%
	H52254	6-Methyl-5-phenylthieno[2,3-d]pyrimidin-4-one, 97%
	H34116	Ethyl 2-amino-5,6,7,8-tetrahydro-4H-cyclohepta[b]thiophene-3-carboxylate, 96%
	H33196	Ethyl 2-amino-5,6-dihydro-4H-cyclopenta[b]thiophene-3-carboxylate, 96%
	H36401	Methyl 1-chloronaphtho[2,1-b]thiophene-2-carboxylate, 96%
	H33025	Methyl 2-(3-chloropropanoylamino)-5,6-dihydro-4H-cyclopenta[b]thiophene-3-carboxylate, 96%
	H33887	Methyl 2-amino-5,6,7,8-tetrahydro-4H-cyclohepta[b]thiophene-3-carboxylate, 96%

Dithianes

A dithiane is a heterocyclic compound composed of a cyclohexane core structure wherein two methylene groups are replaced by sulfur atoms. 1,2-Dithiane, 1,3-dithiane and 1,4-dithiane are three isomeric forms of dithianes. 1,3-Dithianes are used as protecting group of some carbonyl containing compounds due to their inertness to many reactive conditions. The protecting group can be removed with mercuric reagents, a process that exploits the high affinity of Hg(II) for thiolates.

1,3-Dithiane is used as reagent for deoxygenation of sulfoxides to their corresponding sulfides. In addition to being chemical intermediates, dithianes also have certain end applications such as lubricating oil additives for imparting extreme pressure characteristics to mineral lubricating oils and as plasticizers for use in the preparation of synthetic and natural high molecular weight elastomers or polymers.

Dithiane chemistry is used to reverse the characteristic reactivity of a group or atom (polarity reversal or umpolung). An example is the Corey-Seebach reaction, wherein the carbonyl group of ketone is converted to dithiane derivative in which the carbon becomes nucleophilic (Grobel, B.-T.; Seebach, D., □Umpolung of the Reactivity of Carbonyl Compounds Through Sulfur containing Reagents□, Synthesis. 1977, 357-402).

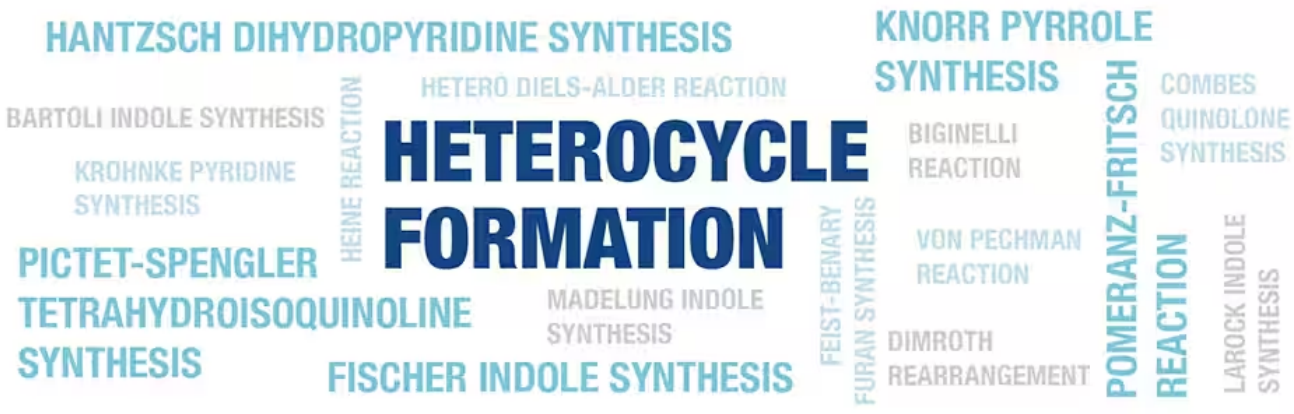


A10505	1,3-Dithiane, 98%
L16255	2,2'-Ethylenebis(1,3-dithiane), 98+%
A14620	2,5-Dihydroxy-1,4-dithiane, 96%
B21471	2-Isobutyl-1,3-dithiane, 97%
L00209	2-Methyl-1,3-dithiane, 98%
H51071	2-Triisopropylsilyl-1,3-dithiane, 97%
L00663	Ethyl 1,3-dithiane-2-carboxylate, 98+%

Thiophene

Thiophene, also known as thiacyclopentadiene, thiole or thiofuran, is a five-membered sulfur containing heterocyclic aromatic compound. Thiophene and its derivatives occur in natural deposits, and function as analogues of furans and pyrroles. Thiophenes undergo a large number of substitution reactions. Thiophene does not behave like thioethers, for example, the sulfur atom in a thiophene resists alkylation and oxidation. While the sulfur atom is relatively unreactive, carbon atoms alpha to sulfur are highly susceptible to attack by electrophiles. Halogens react with thiophenes to give 2-halothiophenes followed by 2,5-dihalo derivatives. In addition to their reactivity towards electrophiles, thiophenes can also be lithiated.

The thiophene core is used as building blocks in many agrochemicals and pharmaceuticals. Thiophene is a well-known bioisostere for benzene and hence finds extensive use in drug design and discovery to enhance activity or reduce toxicity without making significant structural changes. Furthermore, it is used as an additive of photoluminescent materials and pigments. In addition, it is also adopted as a raw material and intermediate in the chemical industry. Polymerized thiophenes on oxidation exhibit good electrical conducting properties through extensive delocalization of electrons and hence are called synthetic metals.



A10808	1-(2-Thenoyl)-3,3,3-trifluoroacetone, 99% (dry wt.) may cont. up to ca 2% water
H26052	1-(2-Thienyl)ethylamine, tech. 90%
H66330	1-(2-Thienyl)piperidine, 98%
L00857	1,3-Di-2-thienyl-2-propen-1-one, 98+%
H51898	2-(1,3-Dimethyl-2,4,6-trioxohexahydropyrimidin-5-ylidenemethyl)thiophene-5-boronic acid pinacol ester, 95%
A16748	2,2':5',2''-Terthiophene, 99%
H37989	2,2'-Bithiophene-5-boronic acid pinacol ester, 98%
A12335	2,2'-Bithiophene, 98%
B24753	2,2'-Thenil, 98%
B24671	2,2'-Thenoin, 97%
H58358	2-(2-Thienyl)acetamidoxime, 97%
H58332	2-(2-Thienyl)benzimidazole, 97%
H26733	2-(2-Thienyl)piperazine, 96%
L04775	2-(2-Thienyl)pyridine, 97%

H50179	2-(2-Thienyl)pyrrolidine, 97%
H54347	2-(2-Thienyl)thiazole-4-carboxylic acid, 97%
L03946	2,3,4-Tribromothiophene, 97%
A11761	2,3,5-Tribromothiophene, 98%
L17207	2,3,5-Trichlorothiophene, 97%
A12998	2,3-Dibromothiophene, 98+%
L11780	2,3-Dichlorothiophene-5-sulfonyl chloride, 97%
L10578	2,3-Dichlorothiophene, 97%
H31641	2,3-Dimethylthiophene, 97%
L13591	2,4-Dibromothiophene, 90+%
L05513	2-(4-Methoxybenzoyl)thiophene, 97%
A14928	2,5-Bis(5-tert-butyl-2-benzoxazolyl)thiophene, 99%
H50177	2-(5-Chloro-2-thienyl)pyrrolidine, 99%
L10348	2,5-Dibromo-3,4-dinitrothiophene, 95%
L02693	2,5-Dibromo-3-methylthiophene, 98%
H55465	2,5-Dibromo-3-n-butylthiophene, 96%
H55958	2,5-Dibromo-3-n-dodecylthiophene, 97%
H55082	2,5-Dibromo-3-n-octylthiophene, 96%
A13406	2,5-Dibromothiophene, 95%

A11278	2,5-Dichloro-3,4-dinitrothiophene, 97+%
H27129	2,5-Dichloro-3-methylthiophene, 96%
L19101	2,5-Dichlorothiophene-3-carboxylic acid, 98+%
L06461	2,5-Dichlorothiophene-3-sulfonyl chloride, 97%
A13839	2,5-Dichlorothiophene, 98%
A12443	2,5-Diiodothiophene, 99%
A10869	2,5-Dimethylthiophene, 98+%
H51958	2-(5-Methyl-2-thienyl)pyrrolidine hydrochloride, 99%
B20751	2-Acetyl-3-amino-5-phenylthiophene, 97%
L10563	2-Acetyl-3-aminothiophene, 97%
L20113	2-Acetyl-3-bromothiophene, 97%
L20114	2-Acetyl-3-chlorothiophene, 97%
L04086	2-Acetyl-3-methylthiophene, 97%
H30384	2-Acetyl-4-chlorothiophene, 98+%
L17617	2-Acetyl-4-methylthiophene, 98%
A14826	2-Acetyl-5-bromothiophene, 99%
A11850	2-Acetyl-5-chlorothiophene, 99%

L17852	2-Acetyl-5-iodothiophene, 97%
A11282	2-Acetyl-5-methylthiophene, 98%
A13062	2-Acetylthiophene, 99%
L13550	2-Acetylthiophene O-methyloxime, 96%
H34049	2-Amino-4-(2-thienyl)benzoic acid, 96%
H58037	2-Amino-4-(2-thienyl)thiazole, 97%
H34442	2-Amino-4-(3-thienyl)benzoic acid, 96%
H32544	2-Amino-4,5,6,7-tetrahydrobenzo[b]thiophene-3-carbonitrile, 97%
B20043	2-Amino-4-methylthiophene-3-carboxamide, 98%
H60699	2-Aminothiophene-3-carbonitrile, 97%
A12036	2-Benzoylthiophene, 98%
H56243	2-Bromo-3-hexylthiophene, 98%
L11393	2-Bromo-3-methylthiophene, 97%
H58575	2-Bromo-4-(2-thienyl)thiazole, 97%
A16682	2-Bromo-5-chlorothiophene, 97%
A15866	2-Bromo-5-nitrothiophene, 97%
H51060	2-(Bromoacetyl)thiophene, 97%
A11959	2-Bromothiophene, 98+%

A15048	2-Butyrylthiophene, 97%
H53210	2-Carboxythiophene-4-boronic acid, 98%
H27957	2-Chloro-3-methylthiophene, 97%
B21657	2-Chloro-5-methylthiophene, 97%
H61936	2-Chloro-N-[2-(2-thienyl)ethyl]-D-phenylglycine methyl ester hydrochloride, 98%
A10390	2-Chlorothiophene, 98+%
H51663	2-[Dimethyl(2-thienyl)silyl]benzyl alcohol
B22640	2-Ethyl-5-methylthiophene, 99%
A13372	2-Ethylthiophene, 99%
L15195	2-Formylthiophene-3-boronic acid, 97%
H53298	2-Formylthiophene-4-boronic acid, 98%
L10938	2-(Heptanoyl)thiophene, 95%
A12898	2-Iodothiophene, 98%, stab. with copper
A10455	2-Methoxythiophene, 99%
L20420	2-Methyl-5-phenylthiophene, 96%
H32224	2-Methylbenzo[b]thiophene, 98%
B20940	2-(Methylsulfonyl)thiophene, 97%
L10083	2-Methyltetrahydrothiophen-3-one, 97%

43456	2-Methyltetrahydrothiophene, 98+%
A12736	2-Methylthiophene, 98%
A11763	2-(Methylthio)thiophene, 97%
B22708	2-n-Butyl-5-ethylthiophene, 97%
B24943	2-n-Butyl-5-methylthiophene, 97%
A12740	2-n-Butylthiophene, 98+%
A12652	2-n-Hexylthiophene, 98%
L11428	2-Nitrothiophene-4-carbonitrile, 97%
L10793	2-Nitrothiophene-4-carboxaldehyde, 97%
A10705	2-Nitrothiophene-4-carboxylic acid, 98%
A17464	2-Nitrothiophene, tech. 85%
A13672	2-n-Octylthiophene, 98%
B21885	2-n-Pentylthiophene, 98%
L03052	2-n-Propylthiophene, 97%

B21678	2-Octanoylthiophene, 99%
H51899	2-(Phenyliminomethyl)thiophene-5-boronic acid pinacol ester, 95%
H60819	2-Phenylthiophene, 95%
A13708	2-(Phenylthio)thiophene, 97+%
L02318	2-Propionylthiophene, 98%
L19221	2-Thiopheneacetamide, 98%
A10394	2-Thiopheneacetic acid, 98%
L09323	2-Thiopheneacetyl chloride, 98%
B21562	2-Thiopheneethanol, 98%
A10920	2-Thiopheneethylamine, 98%
A15768	2-Thiophenemethanol, 97%
A11700	2-Thiophenemethylamine, 97%
L12585	2-(Trifluoroacetyl)thiophene, 98%
L07560	2-(Trimethylacetyl)thiophene, 98%
H61170	2-(Trimethylsilyl)thiophene, 97%
H26326	2-Valerylthiophene, 97%
H34243	3-(1-Pyrrolyl)-2-thiophenemethanol, 97%
A11083	3-(2-Thienyl)-1-(p-tolyl)-2-propen-1-one, 98%

H58030	3-(2-Thienyl)-2(1H)-quinoxalinone, 97%
A10342	3-(2-Thienyl)acrylic acid, predominantly trans, 98+%
H63681	3-(2-Thienyl)-D-alanine, 95%
H63316	3-(2-Thienyl)-L-alanine, 95%
L18538	3-(2-Thienyl)pyridine, 99%
L17704	3,4,5-Trichlorothiophene-2-carbonyl chloride, 97%
A10512	3,4-Dibromothiophene, 98+%
H56674	3,4-Dimethoxythiophene, 98%
H50479	3-[(4-Formylphenoxy)methyl]thiophene-2-carbonitrile
A13867	3-Acetyl-2,5-dichlorothiophene, 98%
A17329	3-Acetyl-2,5-dimethylthiophene, 99%
L13554	3-Acetyl-2-methyl-5-phenylthiophene, 98%
A11078	3-Acetylthiophene, 98%
L12371	3-Aminothiophene-2-carboxamide, 97%
H28040	3-Benzoylthiophene-2-carboxylic acid, 96%
A10603	3-Bromo-2,5-dichlorothiophene, 97%
L19318	3-Bromo-2-chlorothiophene, 97%
H32948	3-Bromobenzo[b]thiophene, 95%

H61497	3-(Bromomethyl)thiophene, 97%
L09328	3-Bromothiophene-2-carbonitrile, 95%
L19386	3-Bromothiophene-2-carboxaldehyde, 94%
L19397	3-Bromothiophene-2-carboxaldehyde diethyl acetal, 97%
L16138	3-Bromothiophene-2-carboxamide, 99%
A11935	3-Bromothiophene-2-carboxylic acid, 97%
A14022	3-Bromothiophene, 97%
H31951	3-Chlorothiophene-2-boronic acid pinacol ester, 95%
L13560	3-Chlorothiophene-2-carboxylic acid, 97+%
B22669	3-Chlorothiophene, 98%, may contain up to 2% DMF
H52377	3-Dimethylamino-1-(2-thienyl)-1-propanone hydrochloride, 97+%
B20296	3-Ethoxythiophene-2-carboxylic acid, 97%
H55898	3-Ethynylthiophene, 96%
L15196	3-Formylthiophene-2-boronic acid, 97%

A12514	Thiophene-2-carboxylic acid, 99%
L12851	Thiophene-2-carboxylic anhydride, 95%
A11270	Thiophene-2-carboxylic hydrazide, 97%
A13046	Thiophene-2-sulfonylacetonitrile, 97%
A15553	Thiophene-2-sulfonyl chloride, 97%
B25225	Thiophene-2-thiocarboxamide, 97%
B22642	Thiophene-2-thiol, contains dimer, 97% as monomer
L12077	Thiophene-3-acetic acid hydrazide, 97%
B23637	Thiophene-3-boronic acid, 98%
L13115	Thiophene-3-carbonitrile, 98%
H61428	Thiophene-3-carbonyl chloride, 97%
A14628	Thiophene-3-carboxaldehyde, 96%
L15520	Thiophene-3-carboxaldehyde diethyl acetal, 98%
L13114	Thiophene-3-carboxaldoxime, 98%
H58858	Thiophene-3-carboxamidoxime, 97%
A15712	Thiophene-3-carboxylic acid, 99%
H51830	Thiophene-3-thiocarboxamide, 97%
A13941	Thiophene, 99%

B25017	trans-3-(3-Thienyl)acrylic acid, 98%
A13379	Tris(2-thienyl)phosphine, 98+%

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