Synthesis and Evaluation of the (S)-BINAM Derivatives as Fluorescent Enantioselective Detectors

Alexander V. Shaferov, Anna S. Malysoeva, Alexei D. Averin, Olga A. Maloshitskaya and Irina P. Beletskaya

Supporting Information

$N_1,N_1'$-((S)-[1,1'-binaphthalene]-2,2'-diyl)bis($N_3$-((S)-tetrahydrofuran-2-yl)methyl)benzene-1,3-diamine (7).

Di-tert-butyl 2,2'-(((S)-[1,1'-binaphthalene]-2,2'-diyl)bis(azanediyl))bis(3,1-phenylene)bis.

(azanediyl)bis(methylene)](2S,2'S)-bis(pyrrolidine-1-carboxylate) (8).

$N_1,N_1'$-((S)-[1,1-binaphthalene]-2,2'-diyl)bis($N_3$-((1S,2S)-2-(benzyloxy)cyclopentyl)benzene-1,3-diamine (9).
(S)-N',N1'-(1,1'-binaphthylene-2,2'-diyl)bis(N3-(2-methoxyethyl)benzene-1,3-diamine) (10).

5-(Dimethylamino)-N-(3-(((S)-2'-(3-((5-(dimethylamino)-N-((S)-tetrahydrofuran-2-yl)methyl)naphthalene)-1-sulfonamido)phenyl)amino)-[1,1'-binaphthalene]-2-yl)amino)phenyl-N-((S)-tetrahydrofuran-2-yl)methyl)naphthalene-1-sulfonamide (14).

4,4'-((((S)-[1,1'-binaphthalene]-2,2'-diyl)bis(azanediyl))bis(3,1-phenylene))bis(((S)-tetrahydrofuran-2-yl)methyl)azanediyl)bis(methylene)bis(7-methoxy-2H-chromen-2-one) (15).
$N_1,N'_1-((S)-[1,1'-binaphthalene]-2,2'-diyl)bis(N_3-(quinolin-6-yl))-N_3-((S)-tetrahydrofuran-2-yl)methyl]benzene-1,3-diamine$ (16).

$Di$-$tert$-butyl-$2,2'$-(((((S)-[1,1'-binaphthalene]-2,2'-diyl)bis(azanediyl))bis(3,1-phenylene))bis(((5-(dimethylamino)naphthalen-1-yl)sulfonyl)azanediyl))bis(methylene)$-$2S_2,2'S_2$-bis(pyrrolidine-1-carboxylate) (17).
Di-tert-butyl-2,2'-((((S)-(1,1'-binaphthalene)-2,2'-diyl)bis(azanediyl))bis(3,1-phenylene))bis(((7-methoxy-2-oxo-2H-chromen-4-yl)methyl)azanediyl))bis(methylene))(2S,2'S)-bis(pyrrolidine-1-carboxylate) (18).

Di-tert-butyl-2,2'-((((S)-(1,1'-binaphthalene)-2,2'-diyl)bis(azanediyl))bis(3,1-phenylene))bis(quinolin-6-ylazanediyl))bis(methylene))(2S,2'S)-bis(pyrrolidine-1-carboxylate) (19).
(S)-N,N’-((1,1’-binaphthalene)-2,2’-diylbis(azanediyl))bis(3,1-phenylene)bis(5-(dimethylamino)-N-(2-methoxyethyl)naphthalene-1-sulfonamide) (22).

(S)-4,4’-((((1,1’-binaphthalene)-2,2’-diylbis(azanediyl))bis(3,1-phenylene))bis((2-methoxyethyl)azanediyl))bis(methylene))bis(7-methoxy-2H-chromen-2-one) (23).
(S)-4,4'-(((1,1'-binaphthalene)-2,2'-diylbis(azanediyl))bis(3,1-phenylene))bis((2-methoxyethyl)azanediyl))bis(methylene))bis(6,7-dimethoxy-2H-chromen-2-one) (24).

(5)-N,N'-(1,1'-binaphthalene)-2,2'-diylbis(N3-(2-methoxyethyl)-N3-(quinolin-6-yl)benzene-1,3-diamine) (25).
(S)-N,N'-(1,1'-binaphthalene)-2,2'-diyl)bis(N,N-(2-methoxyethyl)-N,N-(quinolin-3-yl)benzene-1,3-diamine) (26).

Figure S1. Plausible coordination patterns for amino alcohols with the BINAM-based ligands: (a) coordination with two chiral substituents; (b) coordination with one chiral substituent.
Figure S2. Plausible coordination of amino alcohols with the ligand 26.

Figure S3. Fluorescence spectra of compound 15 in the presence of (R)- and (S)-enantiomers of tert-leucinol (1000 equiv.).

Figure S4. Fluorescence spectra of compound 16 in the presence of (R)- and (S)-enantiomers of tert-leucinol (1000 equiv.).
Figure S5. Fluorescence spectra of compound 23 in the presence of (R)- and (S)-enantiomers of tert-leucinol (1000 equiv.).

Figure S6. Fluorescence spectra of compound 25 in the presence of (R)- and (S)-enantiomers of tert-leucinol (1000 equiv.).
Figure S7. Fluorescence spectra of compound 26 in the presence of (R)- and (S)-enantiomers of leucinol (1000 equiv.).

Figure S8. Fluorescence spectra of compound 26 in the presence of (R)- and (S)-enantiomers of 2-phenylglycinol (1000 equiv.).
Figure S9. Fluorescence spectra of compound 26 in the presence of (R)- and (S)-enantiomers of 2-amino-1-butanol (1000 equiv.).

Figure S10. Fluorescence spectra of compound 26 in the presence of the enantiomers of 2-amino-1,2-diphenylethanol (1000 equiv.).