

Paths of analysis*

(re)Analysis 1381 - No Filter - Rerun

Synthia

November 28, 2023

1 Analysis parameters

Analysis type: Automatic Retrosynthesis

Saved Configuration: General

Rules: Expert-Coded Rules

Published Reactions: SPRESI by DeepMatter, USPTO, Enzyme-Catalyzed Reactions

Filters: none selected

Max. paths returned: 50

Max. iterations: 2000

Commercial:

1. Max. molecular weight - 1000 g/mol
2. Max. price - 1000 \$/g

Published:

1. Max. molecular weight - 1000 g/mol
2. Popularity - 15

My Stockroom:

1. Max. molecular weight - 1000 g/mol

Shorter paths: no

Pathway linearity: COMBO

Protecting groups: BALANCED

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Reaction scoring formula: $\text{TUNNEL_COEF} * \text{FGI_COEF} * \text{STEP} * 20 + 1000 * (\text{FILTERS} + \text{CONFLICT} + \text{NON_SELECTIVITY}) + 40 * \text{PROTECT}$

Chemical scoring formula: $\text{SMALLER}^3, \text{SMALLER}^{1.5}$

Min. search width: 400

Max. reactions per product: 60

2 Paths

1 path found. *Paths are sorted by score. Reactions are sorted in appearance order for each path.*

2.1 Path 1

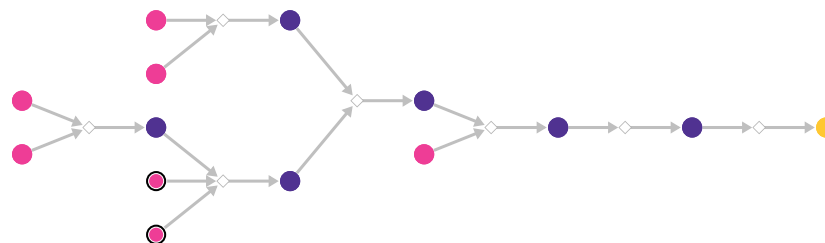
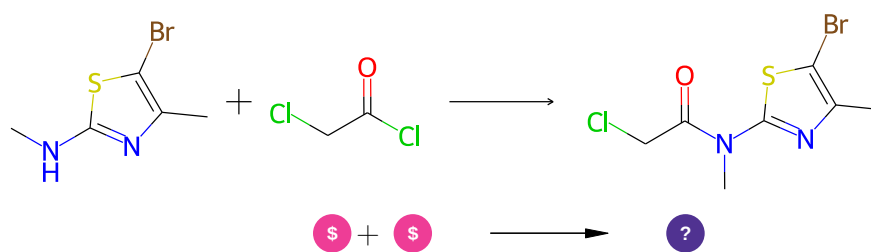


Figure 1: Outline of path 1

2.1.1 Synthesis of tertiary amides from acid chlorides



Substrates:

1. Chloroacetyl chloride
2. 5-Bromo-N,4-dimethylthiazol-2-amine - *available at Sigma-Aldrich*

Products:

1. Cc1nc(N(C)C(=O)CCl)sc1Br

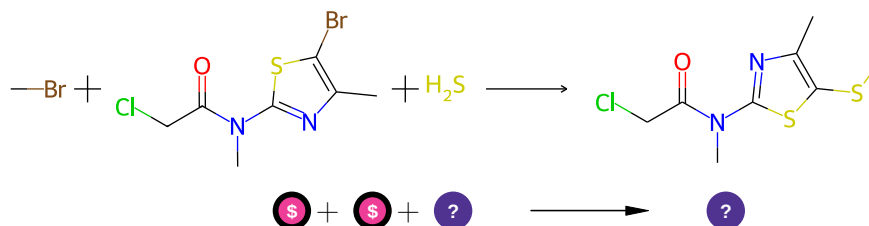
Typical conditions: TEA.DCM.rt

Protections: none

Reference: DOI: [10.1016/j.bmcl.2008.08.004](https://doi.org/10.1016/j.bmcl.2008.08.004) and [10.1016/j.tetlet.2008.05.010](https://doi.org/10.1016/j.tetlet.2008.05.010)

Retrosynthesis ID: 9146

2.1.2 One pot synthesis of aryl-alkyl sulfides



Substrates:

1. Hydrosulfuric acid - [available at Sigma-Aldrich](#)
2. Bromomethane - [available at Sigma-Aldrich](#)
3. Cc1nc(N(C)C(=O)CCl)sc1Br

Products:

1. CSc1sc(N(C)C(=O)CCl)nc1C

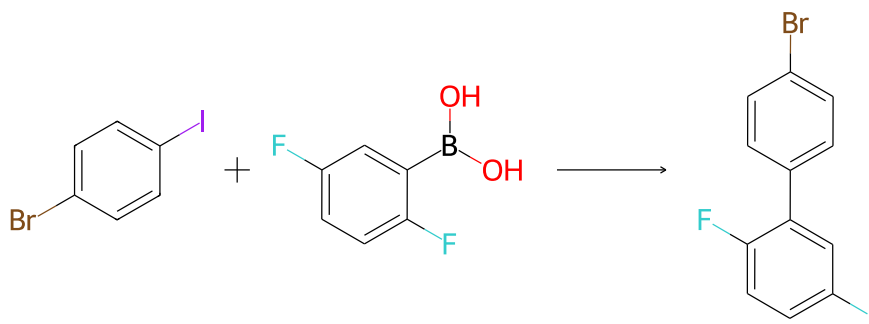
Typical conditions: nBuLi.THF.-78C.then.S.then AlkBr.to.rt

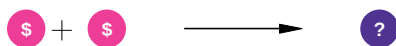
Protections: none

Reference: [10.1021/jo049758h](https://doi.org/10.1021/jo049758h)

Retrosynthesis ID: 5320

2.1.3 Suzuki coupling of arylboronic acids with aryl iodides





Substrates:

1. 2,5-Difluorophenylboronic acid - *Combi-Blocks*
2. 4-Bromo-1-iodobenzene - *available at Sigma-Aldrich*

Products:

1. Fc1ccc(F)c(-c2ccc(Br)cc2)c1

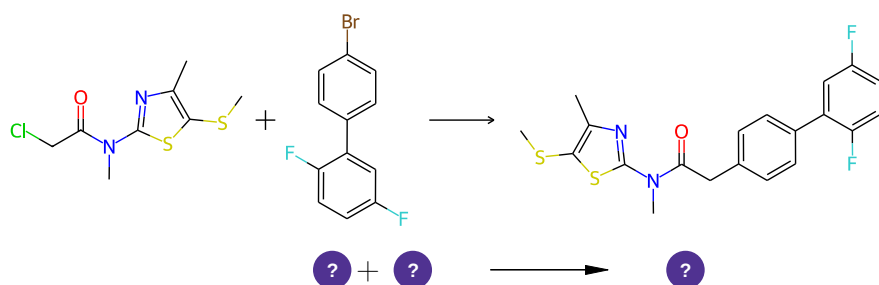
Typical conditions: Pd catalyst.base.solvent

Protections: none

Reference: [10.1021/cr00039a007](#) and [10.1007/3418_2012_32](#) and [10.1021/cr0505268](#) and [10.1016/j.jfluchem.2016.01.018](#) and [10.1039/C3CS60197H](#)

Retrosynthesis ID: 25149

2.1.4 Photoredox Cross-Electrophile Coupling of alpha-Chloro Carbonyls with Aryl Halides



Substrates:

1. Fc1ccc(F)c(-c2ccc(Br)cc2)c1
2. CSc1sc(N(C)C(=O)CCl)nc1C

Products:

1. CSc1sc(N(C)C(=O)Cc2ccc(-c3cc(F)ccc3F)cc2)nc1C

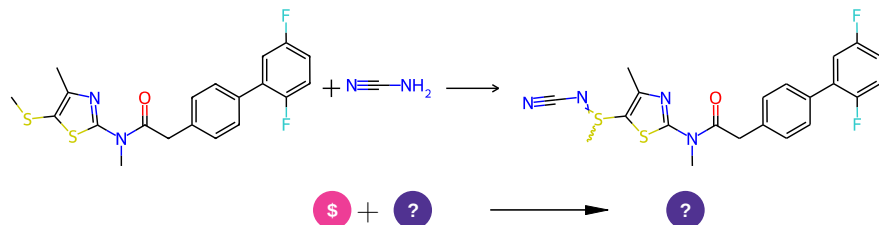
Typical conditions: [Ir]-photocat.[Ni]-cat.silane reagent.base.blue light

Protections: none

Reference: [10.1002/anie.201909072](#)

Retrosynthesis ID: 31016954

2.1.5 Synthesis of N-cyano sulfilimines



Substrates:

1. Cyanamide - *available at Sigma-Aldrich*
2. CSc1sc(N(C)C(=O)Cc2ccc(-c3cc(F)ccc3F)cc2)nc1C

Products:

1. Cc1nc(N(C)C(=O)Cc2ccc(-c3cc(F)ccc3F)cc2)sc1S(C)=NC#N

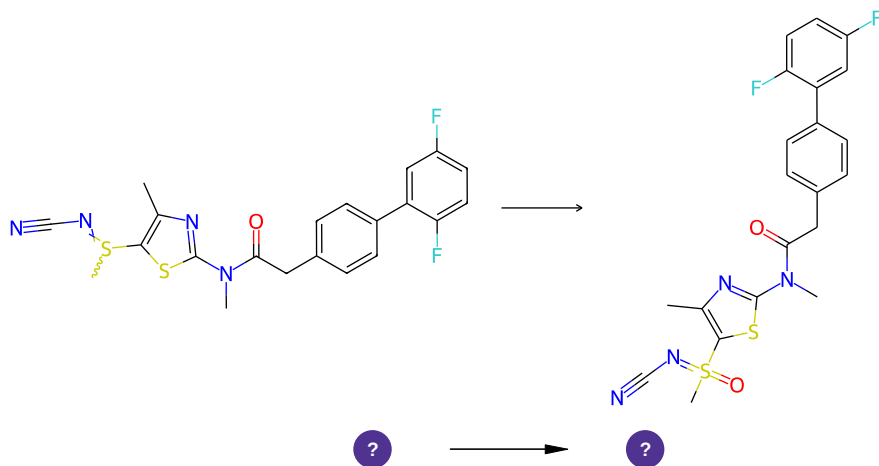
Typical conditions: PhI(OAc)2.CH3CN.0°C

Protections: none

Reference: US3505401A p.3-6 and *10.1021/ol7016577*

Retrosynthesis ID: 10033463

2.1.6 Synthesis of N-cyanosulfoximines by oxidation of N-cyano sulfilimines



Substrates:

1. Cc1nc(N(C)C(=O)Cc2ccc(-c3cc(F)ccc3F)cc2)sc1S(C)=NC#N

Products:

1. Cc1nc(N(C)C(=O)Cc2ccc(-c3cc(F)ccc3F)cc2)sc1S(C)(=O)=NC#N

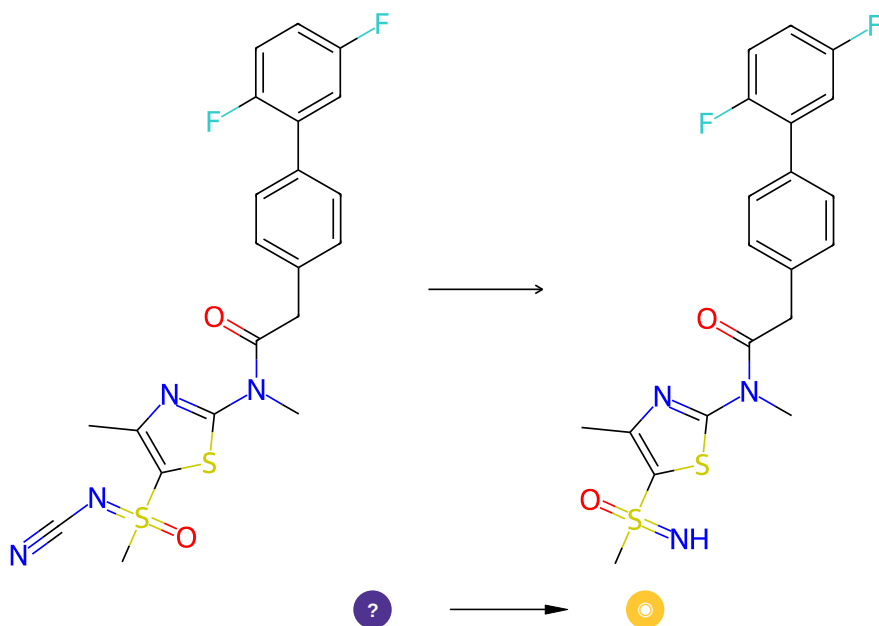
Typical conditions: mCPBA.MeOH.K₂CO₃

Protections: none

Reference: [10.1055/s-0030-1258192](#)

Retrosynthesis ID: 10037382

2.1.7 Synthesis of NH-sulfoximines by hydrolysis of N-cyano sulfoximines



Substrates:

1. Cc1nc(N(C)C(=O)Cc2ccc(-c3cc(F)ccc3F)cc2)sc1S(C)(=O)=NC#N

Products:

1. Cc1nc(N(C)C(=O)Cc2ccc(-c3cc(F)ccc3F)cc2)sc1S(C)(=N)=O

Typical conditions: H₂SO₄.H₂O or HCl.dioxane.H₂O

Protections: none

Reference: [10.1055/s-0034-1378936](#) and US2009029863 p.11

Retrosynthesis ID: 10037380