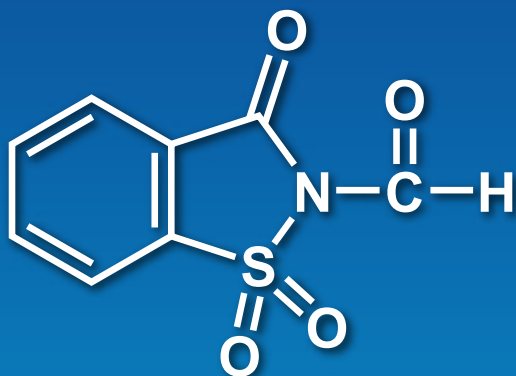


# Powerful *N*-Formylating Reagent



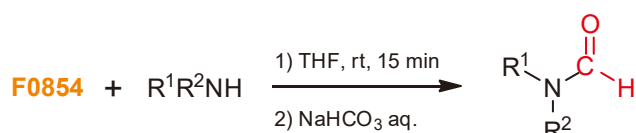
[F0854]

## Advantages

- Formylate Amines under Mild Conditions
- *N*-Formylation proceeds selectively in the case of Amino Alcohols
- Applicable as a Reactive Crystalline CO Source

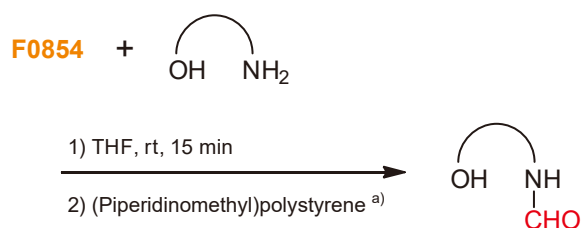
*N*-Formylsaccharin [F0854], which was developed by Cossy *et al.*, is a novel powerful formylating reagent.<sup>1)</sup> The use of F0854 makes it possible to formylate amines under mild conditions. In particular, the selective *N*-formylation proceeds in the case of using amino alcohols as substrates.

## *N*-Formylation of Primary and Secondary Amines



Amine	Product	Y. (%)
		quant.
		81
		75

## Selective *N*-Formylation of Amino Alcohols



Amine	Product	Y. (%)
		55
		90

<sup>a)</sup> Due to the water solubility of *N*-amino alcohols, the polymer-supported base is used in order to trap the acidic byproducts.

Reference 1) T. Cochet, V. Bellosta, A. Greiner, D. Roche, J. Cossy, *Synlett* **2011**, 1920.

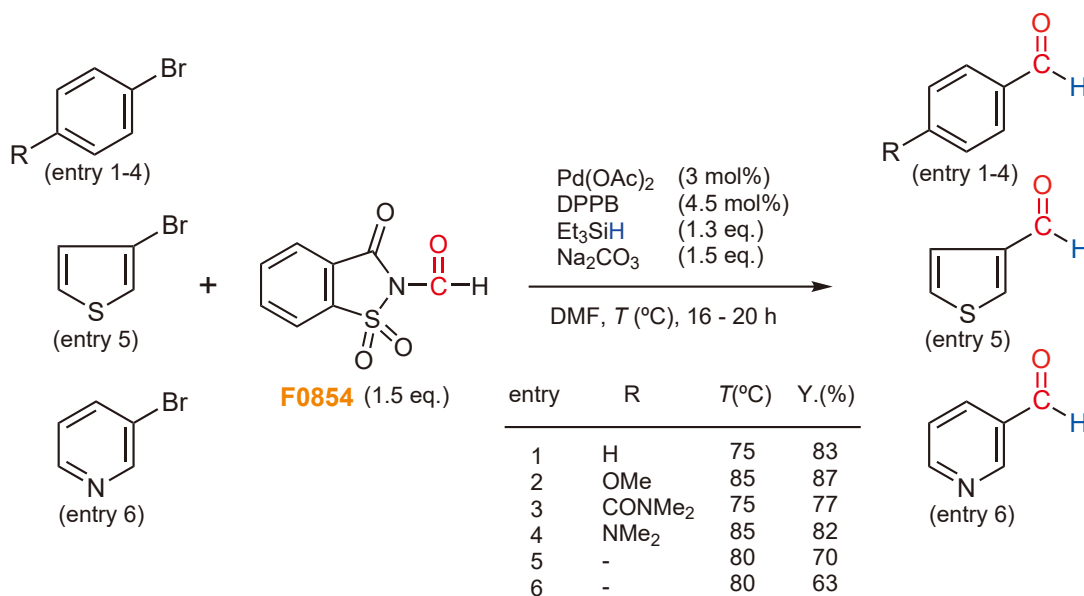
***N*-Formylsaccharin**

5g / 25g [F0854]

# Powerful *N*-Formylating Reagent

In addition, Manabe *et al.* have reported the Pd-catalyzed reductive carbonylation of aryl bromides with **F0854**, and aryl aldehydes are given without using CO gas.<sup>2)</sup> They use **F0854** as an easily accessible and highly reactive crystalline CO surrogate. The reaction proceeds with a small excess amount of **F0854** as a CO source at moderate temperature and is successfully applied to a wide range of aryl bromides.

## Palladium-Catalyzed Reductive Carbonylation Using *N*-Formylsaccarin as a CO source



Reference 2) T. Ueda, H. Konishi, K. Manabe, *Angew. Chem. Int. Ed.* **2013**, *52*, 8611.

## Other Formylating Reagents

1-Formyl-1*H*-benzotriazole

Vilsmeier Reagent

*N,N*-Dimethylformamide

Dichloromethyl Ether

*N*-(Diethylcarbamoyl)-*N*-methoxyformamide

Ethyl *N*-Phenylformimidate

4-Formylmorpholine

1-Formylpiperidine

Cyanomethyl Formate

Formic Acid

Hexamethylenetetramine

*N*-Methylformanilide

Triethyl Orthoformate

Trimethyl Orthoformate

Diethyl Phenyl Orthoformate

Paraformaldehyde

2,2,2-Trifluoroethyl Formate

1g / 5g [B3920]  
 25g / 250g [C1545]  
 25mL / 100mL / 500mL [D0722]  
 25g / 250g [D1645]  
 1g [D2344]  
 5g / 25g [E0495]  
 25g / 500g [F0157]  
 25mL / 100mL / 500mL [F0234]  
 5g / 25g [F0356]  
 300mL [F0513]  
 25g / 500g [H0093]  
 25g / 100g / 500g [M0552]  
 25mL / 500mL [O0066]  
 25mL / 500mL [O0068]  
 5g / 25g [O0187]  
 25g / 500g [P0018]  
 1g / 5g [T2586]

For further information please refer to our website at [www.TCIchemicals.com](http://www.TCIchemicals.com).

Formylating

### Ordering and Customer Service

#### TCI AMERICA

Tel : 800-423-8616 / 503-283-1681  
 Fax : 888-520-1075 / 503-283-1987  
 E-mail : Sales-US@TCIchemicals.com

#### TCI EUROPE N.V.

Tel : +32 (0)3 735 07 00  
 Fax : +32 (0)3 735 07 01  
 E-mail : Sales-EU@TCIchemicals.com

#### TCI Deutschland GmbH

Tel : +49 (0)6196 64053-00  
 Fax : +49 (0)6196 64053-01  
 E-mail : Sales-DE@TCIchemicals.com

#### Tokyo Chemical Industry UK Ltd.

Tel : +44 (0)1865 784560  
 Fax : +44 (0)1865 784561  
 E-mail : Sales-UK@TCIchemicals.com

#### TCI Chemicals (India) Pvt. Ltd.

Tel : 1800 425 7889 / 044-2262 0909  
 Fax : 044-2262 8902  
 E-mail : Sales-IN@TCIchemicals.com

#### 梯希爱(上海)化成工业发展有限公司

Tel : 800-988-0390 / 021-67121386  
 Fax : 021-6712-1385  
 E-mail : Sales-CN@TCIchemicals.com

#### TOKYO CHEMICAL INDUSTRY CO., LTD.

Tel : +81 (0)3-5640-8878  
 Fax : +81 (0)3-5640-8902  
 E-mail : globalbusiness@TCIchemicals.com

Availability, price or specification of the listed products are subject to change without prior notice. Reproduction forbidden without the prior written consent of Tokyo Chemical Industry Co., Ltd.