

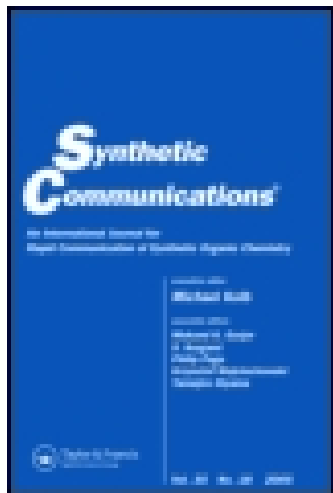
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### Envirocat Epzg<sup>®</sup> as an Efficient Heterogenous Catalyst for Thioacetalization of Carbonyl Compounds

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**ENVIROCAT EPZG<sup>R</sup> AS AN EFFICIENT HETEROGENOUS  
CATALYST FOR THIOACETALIZATION OF CARBONYL  
COMPOUNDS.**

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**ABSTRACT:** The reaction of carbonyl compounds with 1,2-ethanedithiol was efficiently catalyzed by Envirocat EPZG<sup>R</sup> to afford the corresponding dithioacetals in excellent yields.

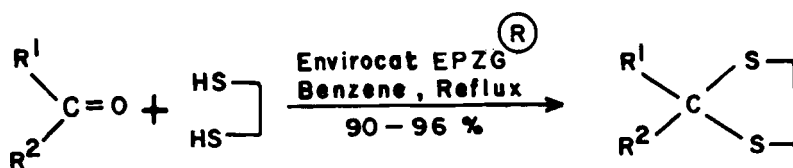
The protection of a carbonyl group as a thioacetal is a well-known important synthetic technique in organic synthesis<sup>1</sup>. In general, thioacetals have been prepared<sup>2-10</sup> by protic acid or Lewis acid-catalyzed condensation of carbonyl compounds with thiols.

In recent years, supported reagents have received a lot of attention as catalysts for organic reactions<sup>11</sup>. Envirocats<sup>R</sup>, a new family of supported reagents, are a breakthrough in environmentally-friendly chemistry<sup>12</sup>. These reagents are capable of catalyzing Friedel-Craft's alkylation and acylation, sulfonylation, oxidation

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and other related processes. In continuation of our interest in the use of Envirocat<sup>R</sup> for organic transformations<sup>13-14</sup>, we now wish to report that Envirocat EPZG<sup>R</sup> serves as an efficient heterogenous catalyst for thioacetalization of carbonyl compounds.



The carbonyl compound, 1,2-ethanedithiol, benzene and Envirocat EPZG<sup>R</sup> were heated and stirred under reflux, with water removed azeotropically. After completion of the reaction, the catalyst was simply filtered off. The reactions proceeded smoothly giving the corresponding products in excellent yields (Table).

In conclusion, Envirocat EPZG<sup>R</sup> has been found to be a convenient and efficient heterogenous catalyst for dithioacetalization of carbonyl compounds. The obvious advantages of Envirocat EPZG<sup>R</sup> in terms of excellent yields, easy separation and recyclability are noteworthy.

## EXPERIMENTAL

Envirocat EPZG<sup>R</sup> was procured from Contract Chemicals, U.K. and was activated prior to use by an azeotropic drying with toluene.

**General Procedure :** To a stirred solution of the carbonyl compound (10 mmol) and 1,2-ethanedithiol(11 mmol) in benzene (15 ml), was added Envirocat EPZG<sup>R</sup> (100 mg). The mixture was heated under reflux using a Dean-Stark trap for water

**TABLE : EnvirocatEPZG<sup>R</sup>- Catalyzed Preparation of Ethylene Dithioacetals.**

Sr. No.	Carbonyl Compound	Time (min.)	Yield <sup>a</sup> (%)	mp. or bp. °C/torr	lit.
				found	
1.	Cinnamaldehyde	30	96	61	61-62 <sup>4</sup>
2.	2-Furaldehyde	45	92	80/5	81/5 <sup>4</sup>
3.	Benzaldehyde	65	95	185/5	185/5 <sup>4</sup>
4.	4-Methylbenzaldehyde	30	93	56	59 <sup>2</sup>
5.	4-Chlorobenzaldehyde	50	92	59	59-60 <sup>4</sup>
6.	4-Methoxybenzaldehyde	85	91	60	60-61 <sup>15</sup>
7.	4-Nitrobenzaldehyde	40	91	68	67-69 <sup>15</sup>
8.	Cyclopentanone	90	90	107/15	53-55/1.5 <sup>2</sup>
9.	Cyclohexanone	70	94	54	54 <sup>2</sup>
10.	Acetophenone	120	94	131/3	94-95/0.5 <sup>2</sup>
11.	4-Methoxyacetophenone	110	93	124/0.5	124/0.3 <sup>2</sup>
12.	Benzophenone	140	90	104	103.3 <sup>2</sup>

<sup>a</sup> Yields refer to isolated products. All compounds were characterized by IR and <sup>1</sup>H-NMR spectra.

separation. The course of the reaction was followed by TLC. Upon completion of the reaction, the mixture was filtered while hot and residue washed with hot benzene (2 x 10 ml). The filtrate was washed with 10% aqueous sodium hydroxide solution (2 x 15 ml) to remove the excess dithiol. The organic layer was washed with water, brine and dried over anhydrous Na<sub>2</sub>SO<sub>4</sub>. The solvent was removed under reduced pressure to afford the product.

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