

## Novel Stereoselective Synthesis of 1,3-Dienyl Tellurides by Palladium Catalyzed Cross-coupling Reaction of (E)- $\beta$ -Bromovinyl Tellurides

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**Abstract:**  $\beta$ -Bromovinyl tellurides are new difunctional reagents which undergo palladium-catalyzed cross-coupling reaction with alkenes to give conjugated dienyl tellurides.

**Keywords:**  $\beta$ -Bromovinyl tellurides, 1,3-dienyl tellurides, palladium catalyzed reaction, synthesis.

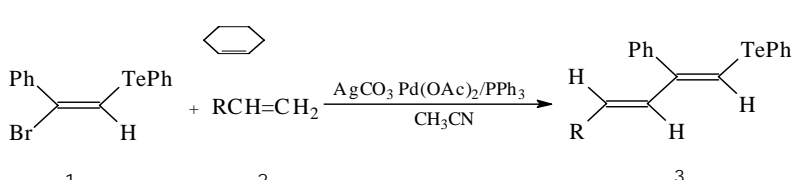
Conjugated dienes are valuable intermediates in organic chemistry. Many biologically active compounds occurring in nature possess the structural skeleton of conjugated dienes such as chillea amide<sup>1</sup> and pelltoine<sup>2</sup>. Besides, the synthesis of conjugated dienes for use in the Diels-Alder reaction is still an important challenge in organic synthesis. One particularly attractive approach has been the incorporation of heteroatom substituents that can activate the diene<sup>3</sup>.

Recently, we found that  $\beta$ -bromovinyl telluride was a biheteroatom reagent. It can be readily synthesized by the addition of aryltellurium tribromides toward alkynes<sup>4</sup>. As  $\beta$ -bromovinyl tellurides contain two different leaving groups and the reactivity of bromo-group is higher than that of telluro-group, in this paper we present a novel stereoselective synthesis of 1,3-dienyl tellurides by palladium catalyzed cross-coupling reaction of  $\beta$ -bromovinyl telluride with alkenes.

The experimental results show that to the solution of (E)- $\beta$ -bromovinyl tellurides **1** (1mmol) and alkene **2** (2mmol) in acetonitrile (5ml) were added Pd (OAc)<sub>2</sub> (0.02mmol) and PPh<sub>3</sub> (0.04mmol), followed by Ag<sub>2</sub>CO<sub>3</sub> (1mmol) under nitrogen. The resulting mixture was stirred at room temperature for 24 h. After the reaction was completed (monitored by TLC), the mixture was poured into water (5ml), extracted with CH<sub>2</sub>Cl<sub>2</sub> (2  $\times$  10ml) dried over sodium sulfate and concentrated. Product (E,E)-conjugated dienyl tellurides **3** were isolated in 65-70% yields by silica gel column using hexane as eluant.

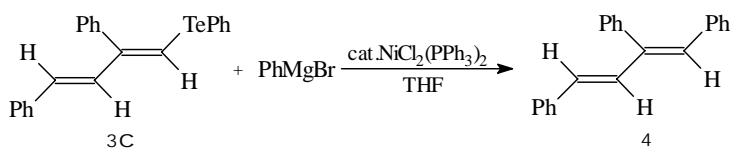
Vinylic tellurides can couple with Grignard reagents in the presence of catalytic amount of nickel-phosphine complexes to afford the corresponding saturated hydrocarbons with loss of tellurium-containing groups<sup>4</sup>, (E,E)-1-Aryltellurobutadienes **3** reacted with Grignard reagents in the presence of NiCl<sub>2</sub> (PPh<sub>3</sub>)<sub>2</sub> to give (E,E)-1,4-trisubstituted-1,3-butadienes **4** in 74% yield.

**Table 1** Synthesis of (E,E)-1,3-dienyl tellurides

Product (3)	Alkenes (2)	mp(°C)	Yield(%) <sup>a</sup>
			
<b>3a</b>		79-81	65
<b>3b</b>	n-C <sub>4</sub> H <sub>9</sub> CH=CH <sub>2</sub>	57-60	70
<b>3c</b>	PhCH=CH <sub>2</sub>	66-68	72
<b>3d</b>	CH <sub>2</sub> =CHCOOC <sub>2</sub> H <sub>5</sub>	50-52	65
<b>3e</b>	CH <sub>2</sub> =CHCN	Oil	67

a. Yield of isolated product

b. All compounds were confirmed by <sup>1</sup>HNMR, IR, MS and elemental analysis.



This method has the advantages of moderate operation, mild conditions and excellent regio- and stereo-selectivity to provide a convenient synthesis of (E,E)-1,3 dienyl tellurides.

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### References

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