

Novel Synthesis of Benzotriazol-1-yl Methyl Selenides and Tellurides

Zhi Zhen HUANG*, Hong Wei JIN, De Hui DUAN

Department of Chemistry, Zhejiang University at Xixi Campus, Hangzhou 310028

Abstract: Benzotriazol-1-yl methyl selenides and tellurides **4a-h** can be simply synthesized by the reaction of **2a-b** with **3** in good yields.

Keywords: Benzotriazol-1-yl methyl selenides or tellurides, synthesis.

Benzotriazole has played an important role as a synthetic auxiliary for preparative chemists¹. It is also well known that organic selenides or tellurides are versatile intermediates in organic synthesis². However, there are only few reports on the synthesis of the difunctionalized compounds containing both benzotriazolyl group and organoselenium or tellurium group³. Herein we wish to report a new and convenient synthesis of benzotriazol-1-yl methyl selenides and tellurides **4a-h**.

Selenium or tellurium powder (2.0 mmol) was added into the solution of Grignard reagent **1** from arylbromide (2.0 mmol) and magnesium (2.0 mmol) in THF (10 mL) and the reaction mixture was stirred at r.t. until selenium or tellurium powder disappeared. The formed magnesium arylselenolate bromide **2a** or magnesium aryltellunolate bromide **2b** then reacted with 1-chloromethylbenzotriazole **3** at r.t. to give benzotriazol-1-ylmethyl selenides and tellurides **4a-h** in good yields (See **Table 1** and **Scheme 1**). The products are fully characterized by ¹H-NMR, IR, MS or elemental analysis⁴.

Scheme 1

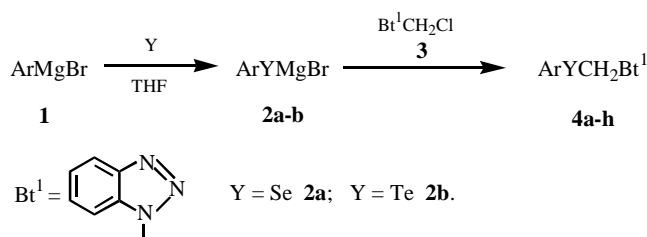


Table 1 Benzotriazol-1-yl Methyl Selenides **4a-f** and Tellurides **4g-h**.

Product	Ar	Y	Reaction Time(h)	Isolated Yield(%)	mp (°C)	
					Found	Reported ³
4a	C ₆ H ₅	Se	6	70	89-90	86-88
4b	<i>p</i> -CH ₃ C ₆ H ₄	Se	6	72	89-91	
4c	<i>o</i> -ClC ₆ H ₄	Se	8	69	96-98	
4h	<i>p</i> -ClC ₆ H ₄	Se	8	71	110-112	110-112
4e	<i>p</i> -BrC ₆ H ₄	Se	7	75	108-110	
4d	<i>p</i> -CH ₃ OC ₆ H ₄	Se	6	80	96-98	
4f	C ₆ H ₅	Te	4	60	122-124	123-125
4g	<i>p</i> -CH ₃ C ₆ H ₄	Te	4	62	112-114	112-114

Compared with the previous method for the synthesis of benzotriazol-1-yl methyl selenides and tellurides **4**³, this method need not prepare diaryl diselenide and the synthesis was completed in one-pot with mild reaction condition. It is much simpler than before. The starting materials are readily available and the yields are good.

References and Notes

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- Typical spectra data are as follows: **4a**. ¹H NMR (CDCl₃, δ ppm): 6.00 (s, 2H, CH₂), 7.22-7.49(m, 8H, ArH), 7.95-8.13 (m, 1H, ArH). **4c**. ¹H NMR (CDCl₃, δ ppm): 6.00 (s, 2H, CH₂), 7.11-7.48 (m, 7H, ArH), 7.95-8.12 (m, 1H, ArH); MS (*m/z*): 324 (M⁺, 10), 132 (100); Anal. Calc.for C₁₃H₁₀ClN₃Se: C 48.2, H 3.1; Found: C 48.5, H 3.2. **4e**. ¹H NMR (CDCl₃, δ ppm): 5.90 (s,2H, CH₂), 7.10-7.50 (m, 7H, ArH), 7.95-8.13 (m, 1H, ArH); MS (*m/z*): 368 (M⁺, 5), 132(100); Anal. Calc. for C₁₃H₁₀BrN₃Se: C 42.5, H 2.7, Found: C 42.6, H 2.8. **4f**. ¹H NMR(CDCl₃, δ ppm): 3.75 (s, 3H, CH₃), 5.91 (s, 2H, CH₂), 6.75 (d, 2H, J = 8Hz, ArH), 7.18-7.43 (m, 5H, ArH), 7.95-8.15 (m, 1H, ArH); MS (*m/z*): 320 (M⁺+1, 5), 132 (100); Anal. Calc. for C₁₄H₁₃N₃OSe: C 52.6, H 4.1; Found: C 52.2, H 4.0. **4g**. ¹H NMR(CDCl₃, δ ppm): 6.15 (s, 2H, CH₂), 7.14-7.49 (m, 8H, ArH), 7.95-8.15 (m, 1H, ArH).

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