Supporting Information

Electrochemical performances of highly amorphous GeO_x powders synthesized in different alcohols for use in Na- and Li-ion batteries

Tetsuya Kajita* and Takashi Itoh.

Frontier Research Institute for Interdisciplinary Sciences, Tohoku University, 6-3 Aoba, Aramaki-aza, Aoba-ku, Sendai-shi Miyagi-ken, 980-8579, Japan

*Corresponding author

E-mail: kajita@fris.tohoku.ac.jp

Contents of supporting information

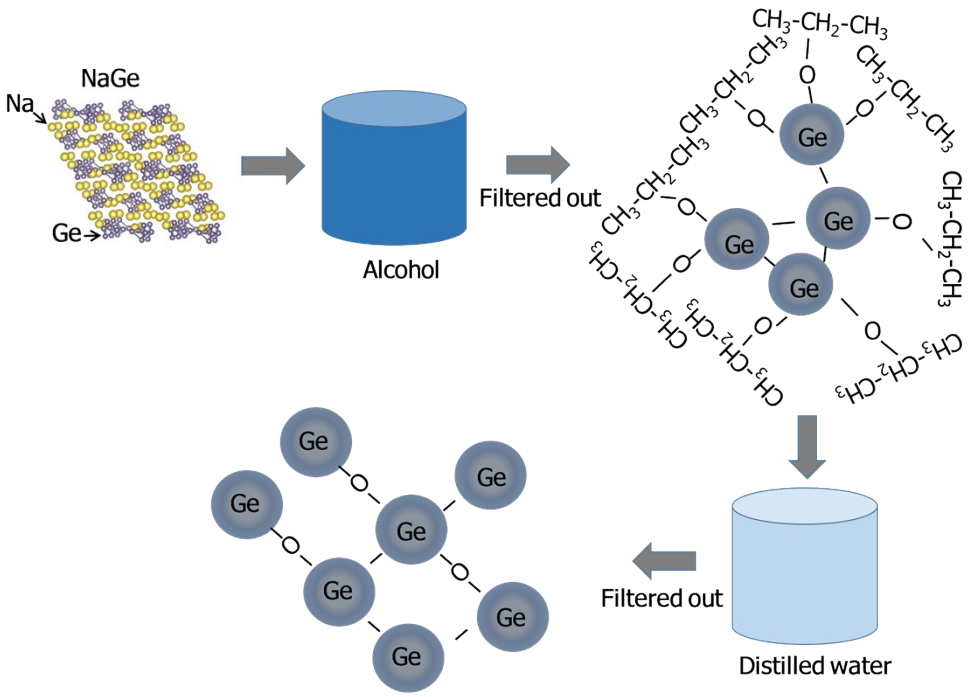

Figure S1 Schematic of expected process of forming GeOx powders.

XRD patterns of the amorphous GeO_x powders synthesized by oxidation using different alcohols.

The broad peaks at approximately 25°and 50° are assignable to amorphous GeO. In the case of the electrode of the powder synthesized using methanol, the sharp peaks at 2θ of 26° is assignable to GeO_2.

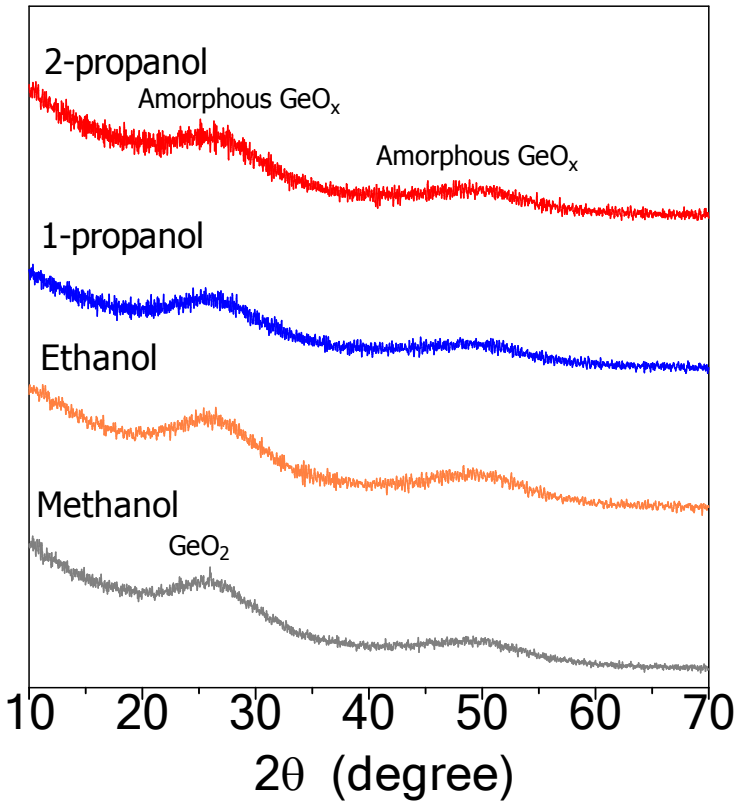

Figure S2 XRD patterns of the amorphous GeO_x powders synthesized by oxidation using different alcohols.

The second charge/discharge curves of the amorphous GeO_x electrodes

The second charge/discharge curves of the amorphous GeOx electrodes are shown in Figure s1. During the 2nd cycle of the Li-ion cell, the electrodes exhibited reversible capacities of 1239–1213 mAh g^{-1} and an efficiency of 90 %. On the other hand, the electrodes used in the Na-ion cell exhibited reversible capacities of 310–319 mAh g^{-1} and an efficiency of 93 %.

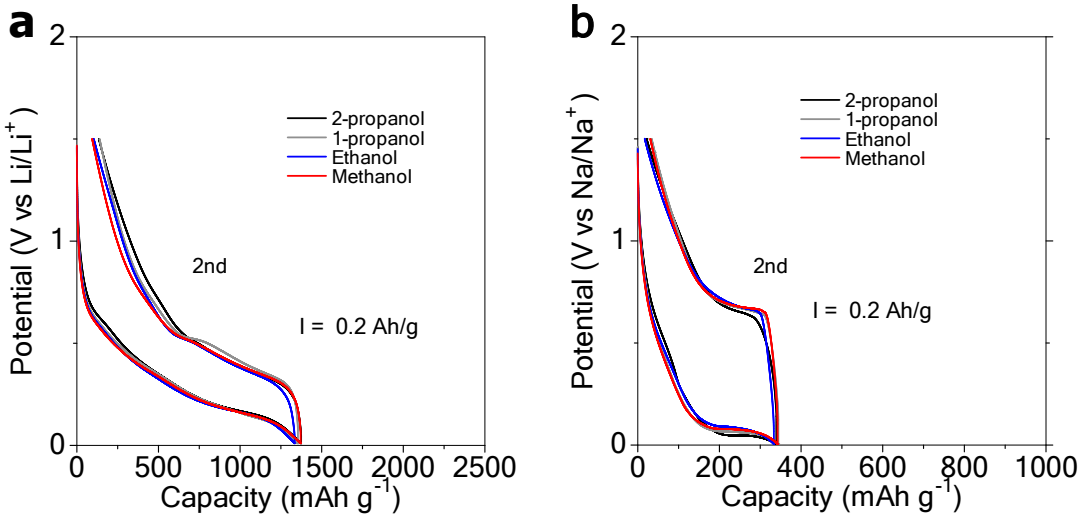

Figure S3 The second charge/discharge curves of the amorphous GeOx electrodes. (a) 2nd cycle in Li-ion cells and (b) 2nd cycle in Na-ion cells.

Table S1 Contribution ratio of Ge states in amorphous GeO_x electrode from deconvolution of Ge 3d spectra.

Contribution ratio of Ge states in amorphous GeO_x electrode (%)			
	Ge	Ge+2	Ge+4
2-propanol	35	25	40
1-propanol	43	24	33
Ethanol	35	30	35
Methanol	50	15	40