Demethylation of Methylated Arsenic Species during Generation of Arsanes with Tetrahydridoborate(1–) in Acidic Media

Karel Marschner*[,†,‡], Stanislav Musil[†], Jiří Dědina[†]

[†]Institute of Analytical Chemistry of the CAS, v. v. i., Veveří 97, 602 00 Brno, Czech Republic

[‡]Department of Analytical Chemistry, Faculty of Science, Charles University in Prague, Albertov 8, 128 43 Prague, Czech Republic

*Corresponding author; E-mail: karel.marschner@biomed.cas.cz

Abstract of Supporting Information

Supporting Information includes details on dependences of demethylation of $DMAs^V$ and $TMAs^VO$. Namely, it contains dependences on concentration of HCl, THB, experiments with hydrolysis coil (HC), and demethylation of $TMAs^VO$ on concentration of HNO_3.

Effect of HCl Concentration

The dependences of arsane fractions formed from $DMAs^V$ and $TMAs^VO$ on concentration of HCl are shown in Figure S-1(a,b).

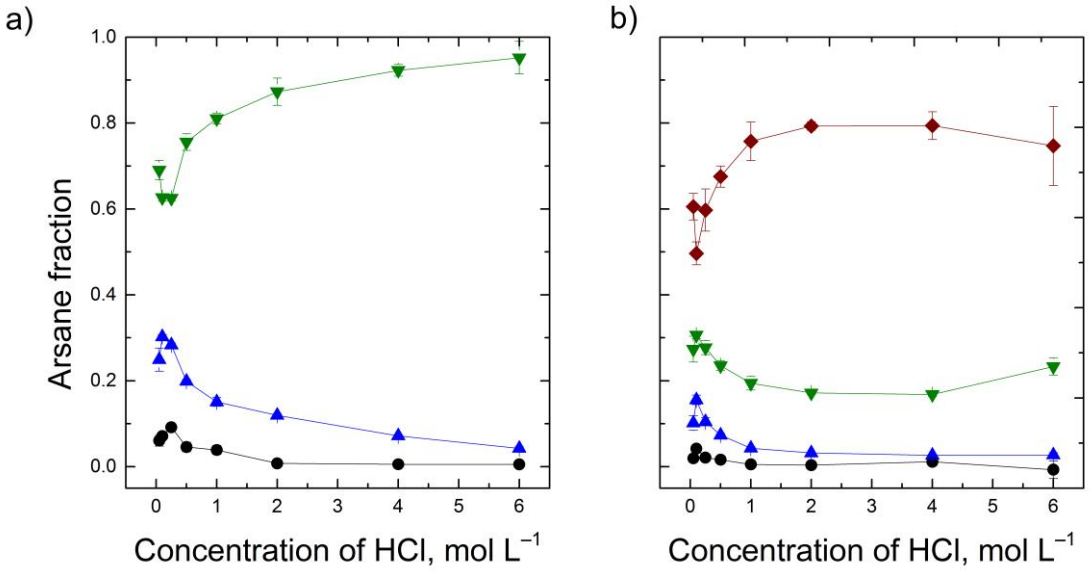

Figure S-1 Dependence of arsane fractions formed from (a) $DMAs^V$ and (b) $TMAs^VO$ on concentration of HCl; (black) ● – AsH_3, (blue) ▲ – CH_3AsH_2, (green) ▼ – $(CH_3)_2AsH$ and (brown) ♦ – $(CH_3)_3As$; concentration of $DMAs^V$ species was 0.5 ng mL^{-1}, concentration of $TMAs^VO$ was 0.5 ng mL^{-1} for HCl concentration range from 0.05 to 1.0 mol L^{-1} and 2.0 ng mL^{-1} for HCl concentration range from 2.0 to 6.0 mol L^{-1}, 1 mL of 1% THB addition.

Effect of THB Concentration

The dependences of arsane fractions formed from $DMAs^V$ and $TMAs^VO$ on concentration of THB are shown in Figure S-2(a,b).

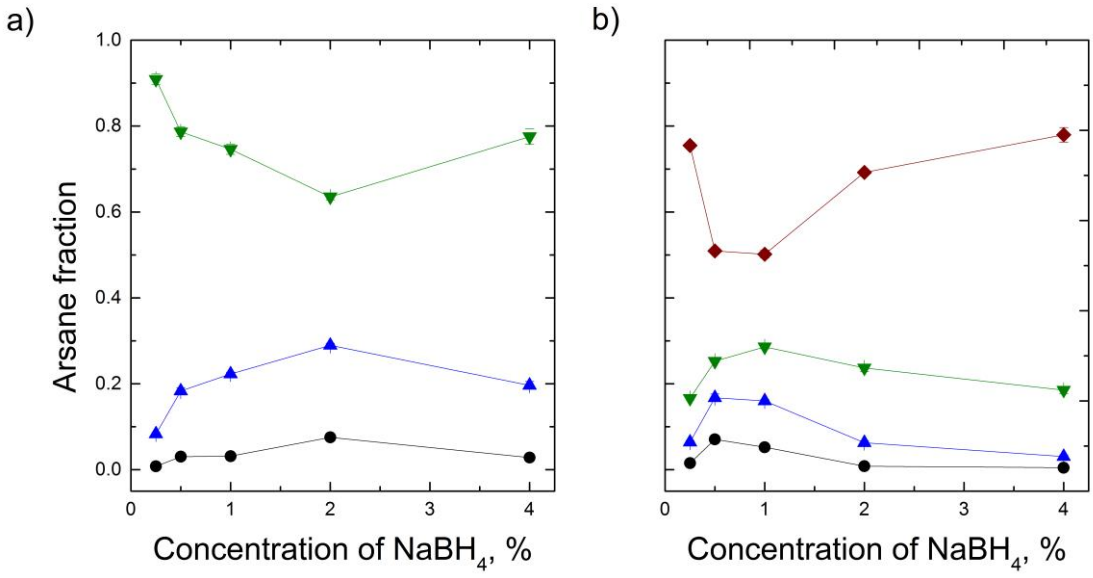

Figure S-2 Dependence of arsane fractions formed from (a) $DMAs^V$ and (b) $TMAs^VO$ on concentration of THB; (black) ● – AsH_3, (blue) ▲ – CH_3AsH_2, (green) ▼ – $(CH_3)_2AsH$ and (brown) ♦ – $(CH_3)_3As$; concentration of As species was 0.5 ng mL^{-1}, 0.25 mol L^{-1} HCl, 1 mL of 1% THB addition.

Prereaction of THB with HCl

The dependences of arsane fractions formed from $DMAs^V$ and $TMAs^VO$ on concentration of HCl used for prereaction are shown in Figure S-3(a,b).

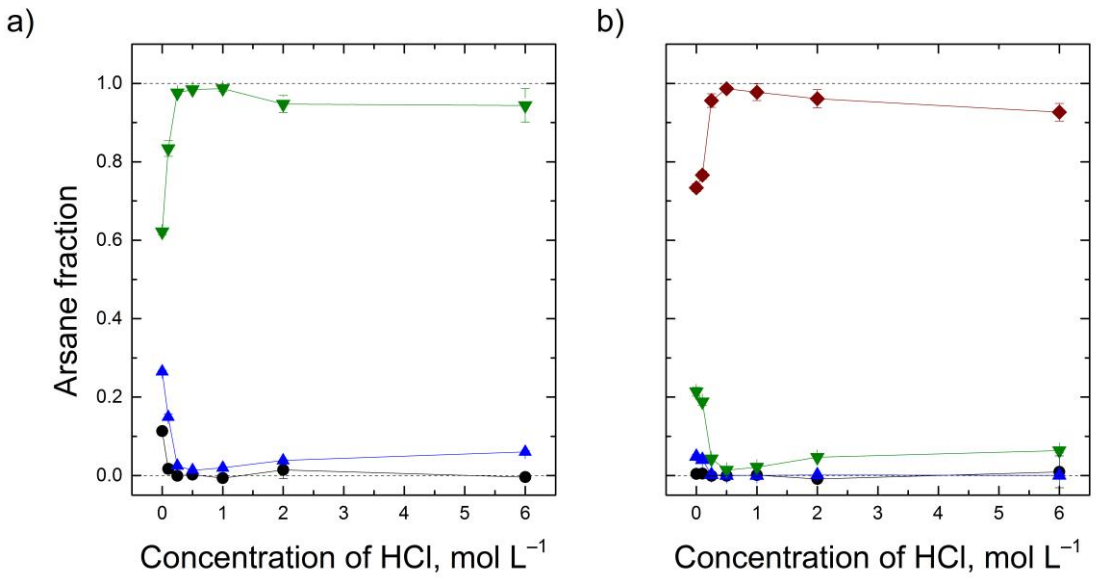

Figure S-3 Dependence of arsane fractions formed from (a) $DMAs^V$ and (b) $TMAs^VO$ on concentration of HCl used for prereaction of THB; (black) ● – AsH_3, (blue) ▲ – CH_3AsH_2, (green) ▼ – $(CH_3)_2AsH$ and (brown) ♦ – $(CH_3)_3As$; HC volume was 40 µL, concentration of $DMAs^V$ species was 0.5 ng mL^{-1}, concentration of $TMAs^VO$ was 0.5 ng mL^{-1} for HCl concentration range from 0 to 1.0 mol L^{-1} and 2.0 ng mL^{-1} for HCl concentration range from 2.0 to 6.0 mol L^{-1}, 1 mL of 1% THB addition, 0.6 mL of 0.25 mol L^{-1} HCl added with standard.

Nitric Acid

The dependences of arsane fractions formed from $TMAs^VO$ on concentration of HNO_3 are shown in Figure S-4. The linear regression of points for $(CH_3)_3As$ gives an equation $y = -0.061x + 0.998$ with $R^2 = 0.9902$ while for $(CH_3)_2AsH$ it gives an equation $y = 0.059x + 0.006$ with $R^2 = 0.9902$. This shows good linearity between demethylation and concentration of HNO_3.

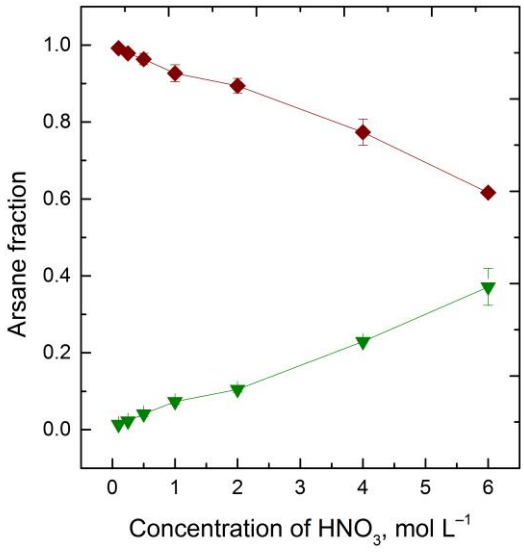

Figure S-4 Dependence of arsane fractions formed from $TMAs^{V}O$ on concentration of HNO_3; (green) ▼ – $(CH_3)_2AsH$ and (brown) ♦ – $(CH_3)_3As$; concentration of $DMAs^{V}$ species was 0.5 ng mL^{-1}, concentration of $TMAs^{V}O$ was 0.5 ng mL^{-1} for HNO_3 concentration range from 0.1 to 1.0 mol L^{-1} and 2.0 ng mL^{-1} for HNO_3 concentration range from 2.0 to 6.0 mol L^{-1}, 1 mL of 1% THB addition.