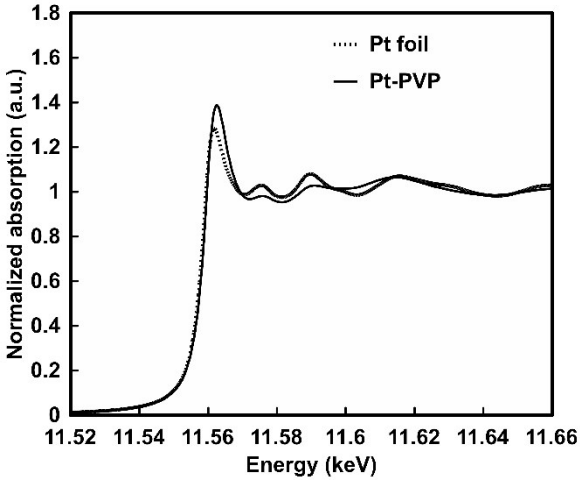
Supporting information

The extended X-ray absorption fine structure (EXAFS) and X-ray absorption near edge structure (XANES) spectra measurements

EXAFS measurements at the Pt L_3-edge were carried out at BL5S1 of Aichi synchrotron radiation center (proposal number 201803007) with a Si(111) double-crystal monochromator in the transmittance mode at room temperature. Fig. S1 shows the



XANES spectra at Pt L_3 -edge of the Pt-PVP, compared to Pt foil standard.

Fig. S1. Pt L_3 -edge XANES spectra of the Pt foil, Pt-PVP.

The EXAFS oscillations (a) and corresponding Fourier transform (b) of the Pt-PVP and Pt foil are shown in Fig. S2.

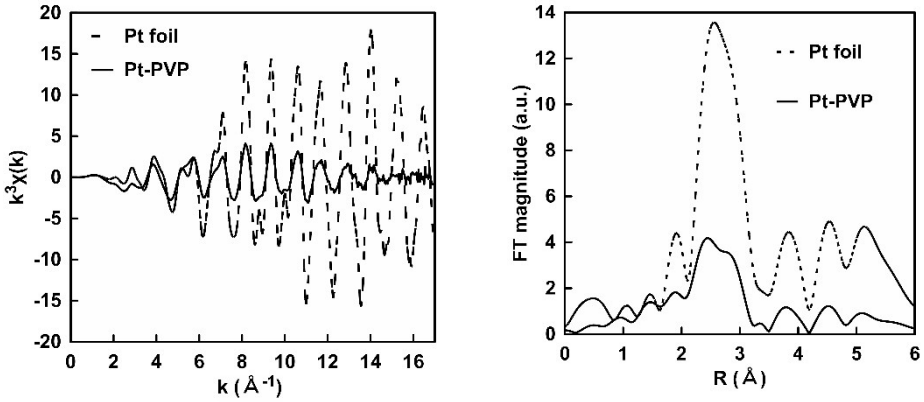


Fig. S2. Pt L_3 –edge EXAFS spectrum (a) and corresponding radial structure function obtained by Fourier transform of EXAFS spectrum (b) of the Pt-PVP and Pt foil.

Acetaldehyde was produced from ethanol with Pt-PVP

95.5 % Ethanol (3 mL) was added in a vial (13 mL), then the air in the vial was removed by bubbling Ar for 15 min. Pt-PVP (0.1 mL) was added there with a syringe, and reacted at 30.5 ^{o}C with a thermostatic chamber. Acetaldehyde was detected with gas chromatograph (GC-2014, SHIMADZU Corporation) with a TCD detector. Activation charcoal column (column length: 3 mm I.D. × 2 m) was equipped for detecting it. The temperature of injection, column and detector were 100.0, 70.0 and 100.0 ^{o}C respectively. Ar gas was used by carrier gas and the flow rate was 30.0 mL/min.

Figs. S3(a) and (b) show the gas chromatography charts of ethanol and acetaldehyde, respectively.

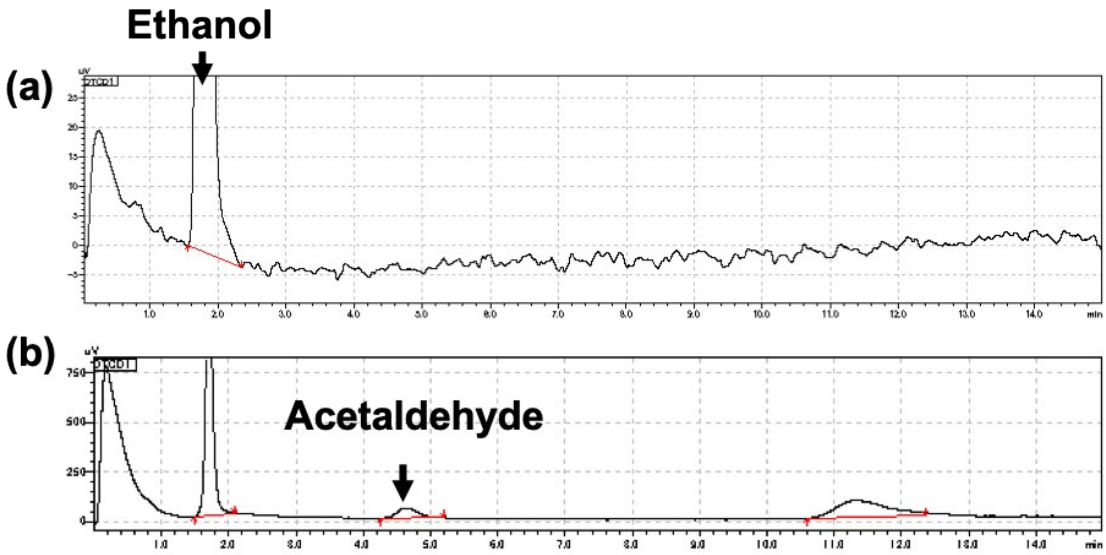


Fig. S3. The gas chromatography charts of ethanol (a) and acetaldehyde (b), respectively.

Fig. S4 shows the chart of gas chromatographic analysis of the gas phase in the system of Pt-PVP and ethanol after 3 and 5 h incubation.

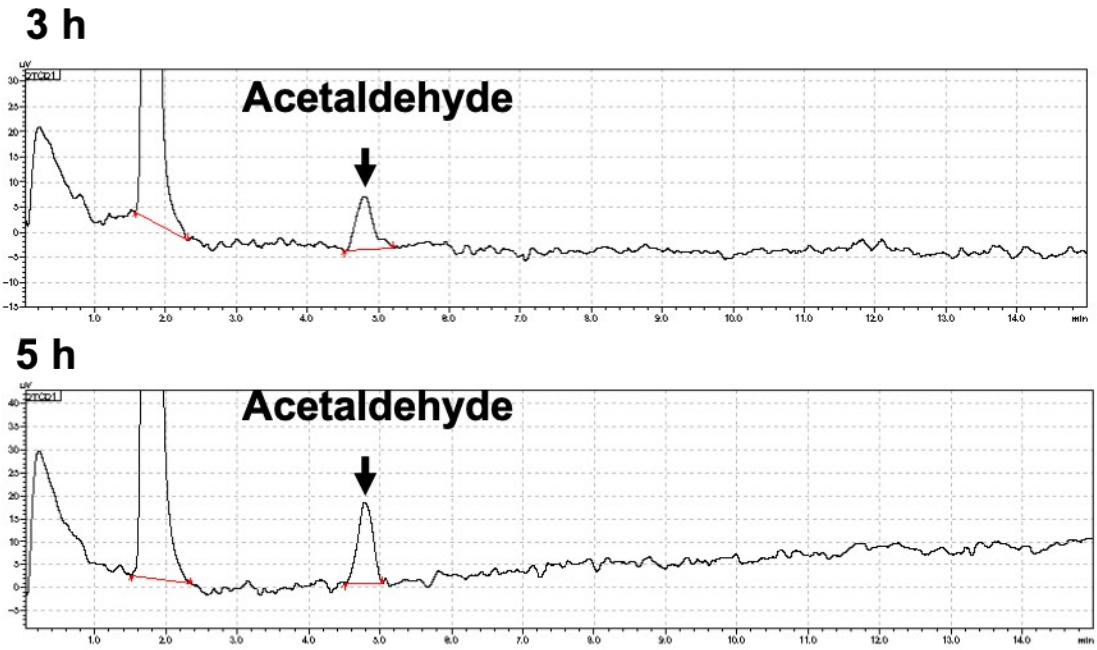


Fig. S4. The gas chromatography charts for analysis of the gas phase in the system of Pt-PVP and ethanol after 3 and 5 h incubation.

From Fig. S4, the peak attributed to acetaldehyde production increased with increasing incubation time.