# Supporting Information

## Pizzarello et al. 10.1073/pnas.1309113110

### SI Text

**Polyether-Type Compounds Listed in the Manuscript and Their Corresponding Chemical Abstracts Service Registry Numbers.**

**Scheme 1, Fig. 2*A*, Table 1.** 2-Propanol, 1-[2-(2-methoxy-1-methylethoxy)-1-methylethoxy]-; 020324-33-8.

**Figure 2*B*, Table 1.** Propanoic acid, 2-methyl, 2-ethyl-3-hydroxyhexyl ester; 74367-31-0

**Table 1.** Ethanol, 2-ethoxy; 110-80-5

2-propanol, 1-(2-ethoxypropoxy)-; 10143-32-5]

Ethanol, 2-(2-ethoxyethoxy); 111-90-0

1-Propene, 3-[2-(2-methoxyethoxy)ethoxy]-; 013752-97-1

Propanoic acid, 2-methyl-, 1-(2-hydroxy-1-methylethyl) 2,2-dimethylpropyl ester; 074367-33-2

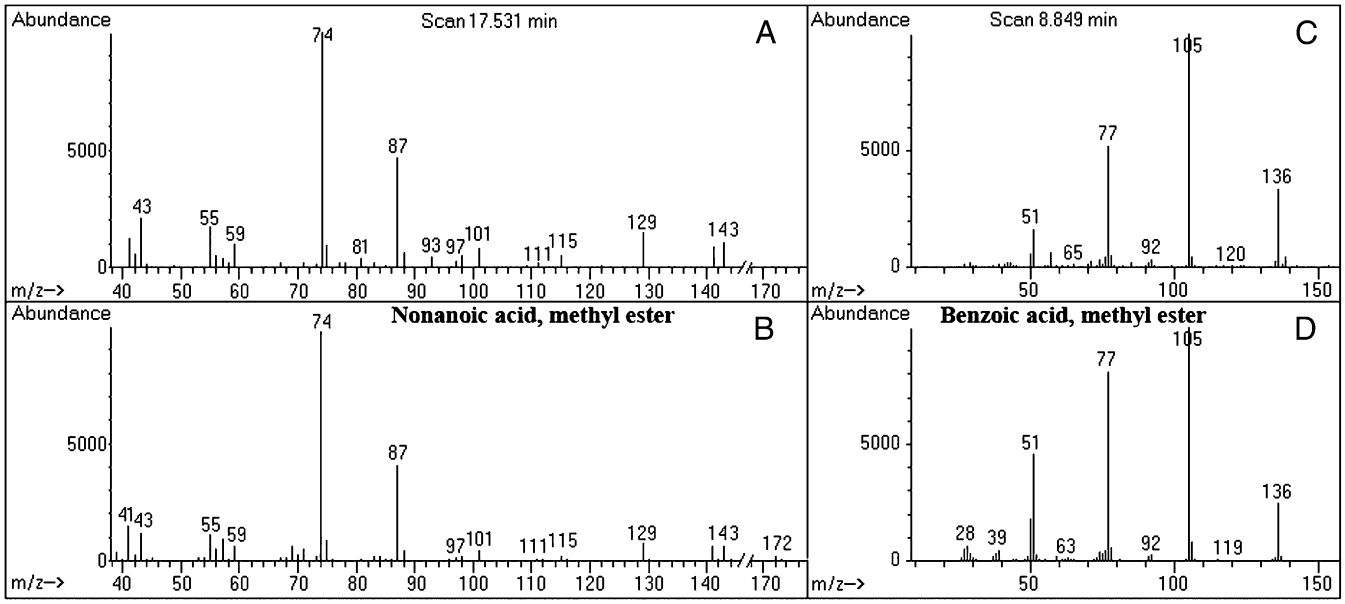



**Fig. S1.** Mass spectra of nonanoic acid, methyl ester (*A*) and benzoic acid, methyl ester (*C*) released hydrothermally from Sutter's Mill insoluble organic material and their respective standards (*B* and *D*).

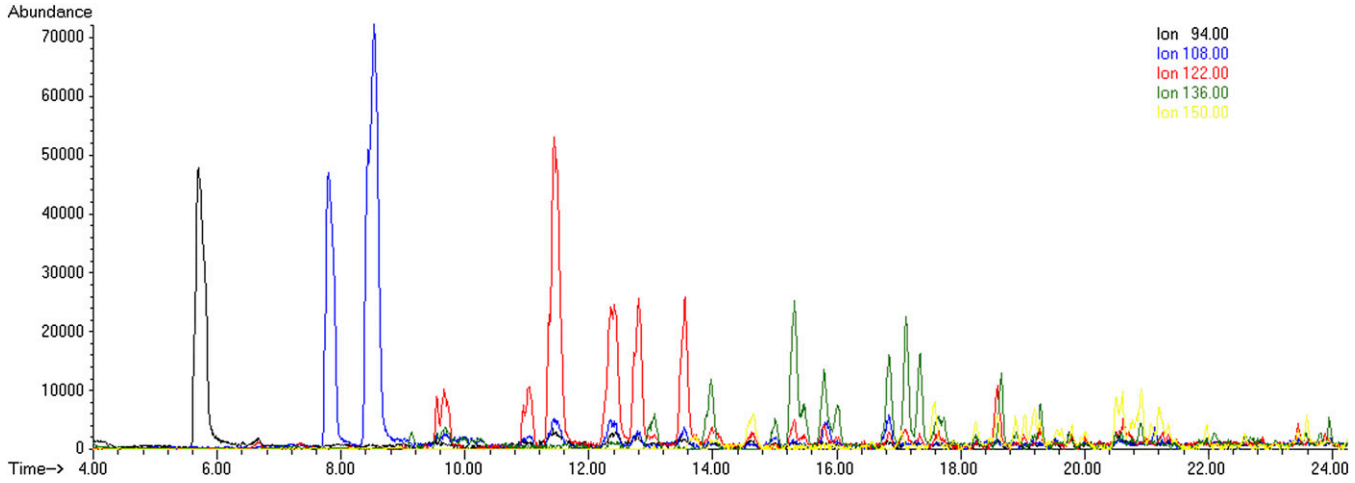
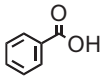
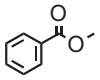
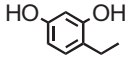
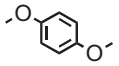
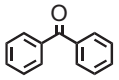



**Fig. S2.** Distribution of phenol (*m/z* 94) and 1C- to 4C-methyl or methyl/ethyl phenols released from a synthetic formaldehyde polymer by hydrothermal treatment, by GC-MS analysis.

**Table S1. Aromatic compounds detected in the hydrothermal extracts of Sutter's Mill IOM**

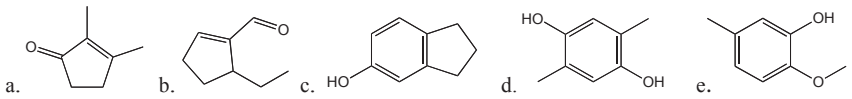
| Compound | Formula | Abu.* |
|---|---|---|
| Naphthalene |  | (+) |
| Phenol |  | (+) |
| Benzoic acid, 840 ng/mg$^2$ |  | ++++ |
| Benzoic acid methylester |  | ++ |
| Benzenediol dimethyl/ethyl |  | + |
| Benzene dimethoxy |  | (+) |
| Benzophenone |  | +++ |
| Benzothiazole |  | + |

*Approximate abundances in nanograms per milligram of extracted IOM. ++++, >500; +++, 100–500; ++, 10–100; +, <10; (+), <1.

**Table S2. Distribution of aromatic hydrocarbons released upon hydrothermal treatment from the insoluble organic materials of four meteorites of different classification**

| PAHs ($M_r$*) | Murchison CM2 | $n$[†] | Ogueil CI1 | $n$ | Tagish Lake[‡] | $n$ | GRA95229 CR2 | $n$ |
|---|---|---|---|---|---|---|---|---|
| $C_1$-$C_5$ benzenes (92–134) | + | ≥15 | + | ≥20 | nf[§] | | +++ | ≥30 |
| Naphthalene[¶] (128) | ++++ | | + | | (+) | | ++++ | |
| $C_1$-Naphthalenes (142) | +++ | 2 | ++ | 2 | (+) | 2 | ++++ | 2 |
| $C_2$-Naphthalenes (156) | ++ | 11 | + | 11 | (+) | | +++ | 11 |
| $C_3$-Naphthalenes (170) | + | ≥22 | + | ≥20 | (+) | 10 | ++ | 18 |
| $C_4$-Naphthalenes (184) | + | | (+) | ≥22 | (+) | 6 | ++ | 7 |
| Biphenyl[¶] (154) | + | | + | | (+) | | +++ | |
| $C_1$-Biphenyl (168) | (+) | 9 | ++ | 4 | (+) | | +++ | 5 |
| $C_2$-Biphenyl (182) | nf[§] | | ++ | | T[‖] | | t | |
| Acenaphthene (154) | + | | (+) | | t | | (+) | |
| Fluorene (166) | ++ | | ++ | | ++ | | ++ | |
| $C_1$-Fluorene (170) | + | 4 | ++ | 4 | + | | ++ | 5 |
| Phenylnaphthalene (204) | + | | + | | + | | (+) | |
| Phenanthrene[¶] (178) | +++ | | ++ | | + | | +++ | |
| Antracene[¶] (178) | + | | (+) | | (+) | | + | |
| $C_1$-Phenanthrene/antracenes (192) | ++ | 6 | + | 7 | ++ | 6 | + | 7 |
| $C_2$-Phenanthrene/antracenes (206) | + | ≥15 | (+) | ≥18 | + | 12 | (+) | 13 |
| Fluoranthene[¶] (202) | ++ | | ++ | | ++ | | ++ | |
| Pyrene[¶] (202) | ++ | | ++ | | +++ | | ++ | |
| $C_1$-Fluoranthene/pyrene (216) | + | 9 | + | 10 | +++ | 10 | + | 10 |
| $C_2$-Fluoranthen//pyrene (230) | (+) | ≥20 | (+) | ≥20 | + | >40 | t | ≥20 |
| Terphenyls (230) | t[‖] | 1 | (+) | 1 | ++++ | 2 | t | 1 |
| Benz[*a*]anthracene (228) | +(+) | | (+) | | (+) | | (+) | |
| Triphenylene (228) | + | | + | | (+) | | (+) | |
| Chrysene (Chr) (228) | + | | + | | (+) | | (+) | |
| $C_1$-Chrysene/BenzoPhen. (242) | (+) | 18 | t | ≥20 | Check | | | |
| BenzoFlt/BenzoPyr/Perylene (252) | ++ | 7 | + | 6 | + | 3 | (+) | |

++++, ≥100 ppm/mg; +++, >10 ppm/mg; ++, >1 ppm/mg; +, >0.1 ppm/mg. PAH, polycyclic aromatic hydrocarbon.
*Relative molecular mass.
[†]Number of molecular species.
[‡]Unclassified.
[§]Not found.
[¶]Identified with standards.
[‖]Traces.




**Scheme S1.** Molecular species detected the hydrothermal extracts of a synthetic formaldehyde polymer. (*A*) 2-Cyclopenten-1-one, 2,3-dimethyl; (*B*) 5-ethylcyclopent-1-enecarboxaldehyde; (*C*) 1*H*-indene-5-ol, 2,3-dihydro; (*D*) 2,5-dimethylbenzene-1,4-diol ; (*E*) 2-methoxy-5-methylphenol.