

Supporting Information for “Free-Radical Polymerization of Acrylic Acid under Extreme Reaction Conditions Mimicking Deep-Sea Hydrothermal Vents”

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Table S1. Reaction conditions employed in this work.

Run	$T@T1 / ^\circ\text{C}$	$T@T2 / ^\circ\text{C}$	$T@T3 / ^\circ\text{C}$	Reaction time / sec
1	21	21	17	6.0
2	53	47	18	6.0
3	76	64	18	5.9
4	100	89	19	5.8
5	110	93	19	5.8
6	120	102	19	5.8
7	126	107	20	5.7
8	130	111	22	5.7
9	140	120	23	5.7
10	150	129	23	5.6
11	175	150	25	5.5
12	200	173	25	5.4
13	250	217	26	5.0
14	300	265	35	4.6
15	350	317	40	4.0

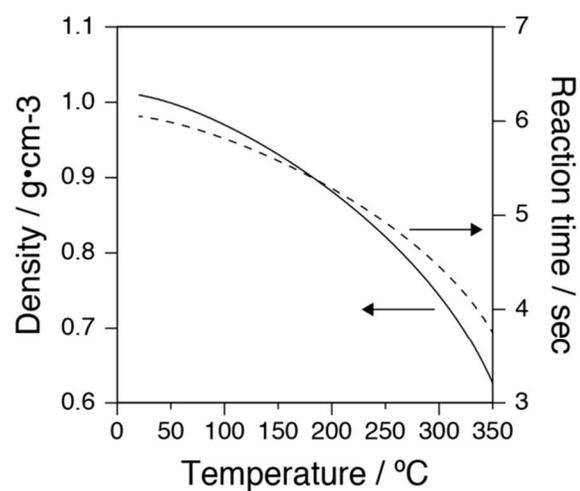


Figure S1. Change of density of water at 25 MPa as a function of temperature (solid curve). Shown also is change of the reaction time associated with the density change of water (dotted curve).

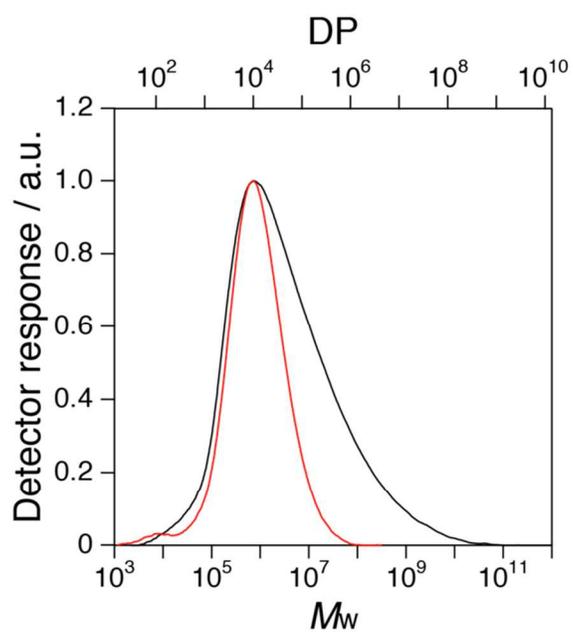


Figure S2. SEC profiles of commercial PAA ($M = 4.5 \times 10^5$) before (black) and after (red) treatment at 200 °C and 25 MPa for 5.2 sec.

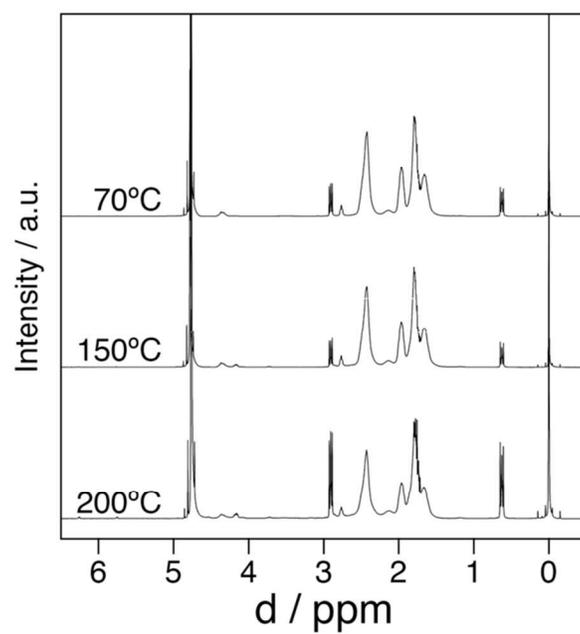


Figure S3. ¹H-NMR spectra of PAA obtained by conventional free radical polymerization at 70 °C (top) and obtained by HIP at 150 °C and 25 MPa (middle) and at 200 °C and 25 MPa (bottom). The spectra were recorded in D₂O at 25 °C.