

**TABLE S2** Geographical and physico-chemical data from isolation sites of rubisco-containing *Thermus* strains

Strain	Isolated from	Rubisco large and small subunit present?	Carbonic anhydrase or Ferripyochelin binding protein <sup>a</sup> present?	Carboxysome proteins (carbon dioxide concentrating mechanism protein)	Temperature (°C) and pH of isolation point	Prevalent geochemical trait of hot spring / thermal area	References
<i>Thermus</i> sp. YIM 77409	Sediment from Niujiea ancient hot spring in Eryuan, Dali, Yunnan Province, South-West China	Yes	No DELTA BLAST result for either Carbonic anhydrase or Ferripyochelin binding protein	No <sup>b</sup>	T = 84 pH 7.4	Na <sup>+</sup> = 206.3 mg/L NH <sub>4</sub> <sup>+</sup> = 115.94 mg/L K <sup>+</sup> = 38.51 mg/L Ca <sup>2+</sup> = 37.06 mg/L NO <sub>3</sub> <sup>-</sup> = 8.47 mg/L NO <sub>2</sub> <sup>-</sup> = 2.32 mg/L	Personal communication: Prof. Brian Hedlund (University of Nevada, USA)
<i>T. antranikianii</i>	Hot water spring, Hrúni, Iceland	Yes	Carbonic anhydrase	No	T = 80 – 88 pH 9.1	SiO <sub>2</sub> = 54.9 mg/L Na <sup>+</sup> = 39.8 mg/L SO <sub>4</sub> <sup>2-</sup> = 28.3 mg/L HCO <sub>3</sub> <sup>-</sup> = 27.35 mg/L Cl <sup>-</sup> = 12.9 mg/L Ca <sup>2+</sup> = 4.01 mg/L K <sup>+</sup> = 0.6 mg/L	(1) Personal communication: Magnús Ólafsson, Iceland Geosurvey
<i>T. scotoductus</i> K12 <sup>c</sup>	Biofilm community on trunks of dead, steaming trees in the Puhimau thermal area on the flank of Kilauea volcano, Hawaii, USA.	No <sup>a</sup>	Carbonic anhydrase	No	T = 55 - 66 pH 3.8 – 4.2	Escaping steam and dead vegetation trademark of this thermal area High levels of CO <sub>2</sub> , Hg, He and various sulfur compounds rising from ground	(2) Personal communication: Prof. Gary King (Louisiana State University, USA)
<i>Thermus</i> sp. NMX2A.1	Jemez Hot spring, New Mexico, USA	Yes	Ferripyochelin binding protein	No	T = 71 pH = 7.7	Saturated in CaCO <sub>3</sub> Travertine is pure calcite (no aragonite present)	(3) Personal communication: Prof. Tom Kieft (New Mexico Tech, USA)

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<i>T. filiformis</i>	Clamshell hot spring, Waimangu, New Zealand	Yes	Carbonic anhydrase	No	T = 85 pH = 8.0	Na <sup>+</sup> = 729 mg/L Cl <sup>-</sup> = 528 mg/L Si <sup>4+</sup> = 301 mg/L HCO <sub>3</sub> <sup>-</sup> = 174 mg/L SO <sub>4</sub> <sup>2-</sup> = 135 mg/L K <sup>+</sup> = 100 mg/L	(1, 4) Personal communication: Prof. Hugh Morgan (University of Waikato, New Zealand)
<i>T. islandicus</i>	Fumarole HS 605 in Torfajokull geothermal area, Iceland	Yes	Ferripyochelin binding protein	No	T = 74 pH = 6.0	Emitting large volumes gas: CO <sub>2</sub> = 8330 mmole/kg H <sub>2</sub> = 47.9 mmole/kg H <sub>2</sub> S = 14.5 mmole/kg Hot spring waters in this area are of the bicarbonate type	(5 - 7)
<i>T. yunnanensis</i>	Hot spring locations of Tengchong, Yunnan province, (China)	Yes	Carbonic anhydrase	No	Not reported	Not reported	(8)
<i>T. igniterrae</i>	Hot water spring, Reykyaflot Iceland	Yes	Ferripyochelin binding protein	No	T = 73 pH = 8.9	SiO <sub>2</sub> = 252.4 mg/L Na <sup>+</sup> = 109.1 mg/L SO <sub>4</sub> <sup>2-</sup> = 64.1 mg/L HCO <sub>3</sub> <sup>-</sup> = 54.4 mg/L Cl <sup>-</sup> = 30.7 mg/L K <sup>+</sup> = 5.97 mg/L Ca <sup>2+</sup> = 1.52 mg/L	(1) Personal communication: Magnús Ólafsson, Iceland Geosurvey

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<i>T. oshimai</i> <i>T. oshimai</i> JL-2	Hot springs from S. Pedro do Sul, (Portugal) and Hveragerdi, (Iceland) Sandy's Spring West (Nevada, USA)	Yes	Carbonic anhydrase	No	T = 50.0 <sup>e</sup> pH = 8.5 <sup>e</sup> T = 86.6 <sup>f</sup> pH = 7.21 <sup>f</sup>	<u>Iceland</u> : Mainly Na-HCO <sub>3</sub> and Na-Cl type water <u>USA</u> : Circumneutral Na-Cl springs, high levels of SiO <sub>2</sub> , Na <sup>+</sup> and Cl <sup>-</sup>	(1, 9 - 12)
<i>T. calditerrae</i>	Hot spring from Hydrothermal Explosion (Shuirebaozhaqu), Rehai geothermal field in Tengchong county (south-western China)	Yes	Carbonic anhydrase	No	T = 79.8 pH = 7.5	Spring water of Na-HCO <sub>3</sub> -Cl type, Major anion is HCO <sub>3</sub> <sup>-</sup> (622 mg/L)	(13 - 15)

<sup>a</sup>Gamma-carbonic anhydrase-like protein

<sup>b</sup>No DELTA BLAST results were obtained for carbon dioxide concentrating mechanism protein (ccm) when using either the ccmK, K2, K4, L, M,N and O-proteins from of model cyanobacterium *Synechococcus elongatus* PCC 7942 as query

<sup>c</sup>*T. scotoductus* K12: partial genome sequence. Also note that this Rubisco amino acid sequence is incomplete on the C-terminal end.

<sup>d</sup>DELTA-BLAST did not produce a result for the small Rubisco-subunit of strain K12

<sup>e</sup>*T. oshimai* strain JL-2 isolated from hot spring in Nevada, USA

<sup>f</sup>*T. oshimai* type strain isolated from hot spring off run at S. Pedro do Sul, Portugal. Hot spring vent was 69°C, pH 8.8 (personal communication Milton da Costa)