Earliest geological record in North China Craton: 4079 Ma Zircon U-Pb age

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Evolution of early solid Earth is vital in the research of Precambrian geology. To date rocks older then 4.0 Ga have been only reported from Acasta gneisses in the Wopmay Orogeny of Canada, with a formation age of 4016 Ma representing the oldest crust record in North America, and detrital zircon with age from 4.1 to 4.4Ga are reported only from Jack Hill of the Yilgarn Craton (Compston and Pidgeon, 1986; Wilde *et al*, 2001) and South Tibet of China (Wen *et al*, 2006). It is worth to note, all these detrital zircons Older than 4.05 Ga are from Gondwanaland.

Here we report a zircon with LA-ICP-MS U-Pb age of 4079±5Ma, from the south margin of the North China Craton (NCC). The zircon is a fragment with size of 100×150 μm have clear core-mantle structure. It is an genocrystal zircon from a 456.4Ma andesite from Caotangou group, West Qinling belt along the south margin of NCC. Moreover, a variety of age is dated from the inherited xenocrystal zircons, including 3233Ma, 2788Ma, 2739Ma and 2714Ma (table 1). The recognition of 4079±5Ma zircon set earliest crustal record in NCC, and indicates that early crust older than 4.05 Ga may present in the Laurasialand.

	$^{207}Pb/^{206}Pb$		$^{207}Pb/^{235}U$		$^{206}Pb/^{238}U$		$^{208}Pb/^{232}Th$	
	age	error	age	error	age	error	age	error
C1TW.13	2739	7	2731	9	2719	17	2672	30
C1TW.24	4079	5	4034	7	3944	21	3488	25
C1TW.b02	3233	24	3198	12	3144	22	3129	25
C1TW.b03	2788	6	2731	8	2654	15	2645	22
C1TW.b10	2714	19	2638	9	2541	15	2517	17

Table 1 U-Pb age of xenocrystal zircon from Caotangou group (Ma)

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Solar wind Mg, Cr and Fe abundances in diamond-like carbon collector from Genesis mission

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The chemical composition of the Sun provides the reference standard for a wide variety of astronomical, cosmochemical and geochemical studies. To better determine the solar composition, the Genesis spacecraft collected solar wind at the L1 point in space for 27 months from December 2001 to April 2004. Prior SIMS analyses of Genesis samples have found discrepant results for the Mg and Fe solar wind fluences from different collector materials (Burnett *et al*., 2007). We measured Mg, Cr and Fe abundances in a diamond-like carbon collector (sample 60062) using a CAMECA NanoSIMS 50L ion microprobe. A 4 nA -16kV O^- primary beam of about 2 μm in diameter was rastered at 25×25 μm^2 on the sample surface. Positive secondary ions were extracted from the central 25% of the rastered area and measured with a double-focus multi-collector mass spectrometer. Masses ^{12}C, ^{24}Mg, ^{25}Mg, ^{52}Cr, ^{54}Fe and ^{56}Fe were measured simultaneously to a depth of about 500 nm from the surface. ^{25}Mg and ^{54}Fe implanted standards were measured before, after and in between sample analyses to quantify relative fluences. We analyzed 10 craters with one showing abnormally low ^{12}C count rates and thus excluded. One crater showed significant surface contamination of Fe and no Fe data could be deduced. We found a Mg fluence of $4.33\pm0.26\times10^{12}$ cm^{-2} and an Fe fluence of $2.39\pm0.15\times10^{12}$ cm^{-2} for sample 60062. These are in good agreement with previous measurement of the same samples by ims-6f (Burnett *et al*., 2007). As seen before, the fluences derived from diamond-like C are higher than those from Si collectors; an explanation for this discrepancy is still lacking but the results from Si are preferred. We also collected ^{52}Cr depth profiles. Since no Cr implant standard was available at the time of our analyses, we estimated a Cr fluence of 2.4×10^{11} using the relative Cr/Fe sensitivity factors in diamond of Wilson (1995). This is 4 times higher than the photosphere value (Asplund *et al*., 2005). However, surface contamination for this sample is apparently a contributing factor. Analyses of additional elements and collector materials will be conducted to get accurate data of the solar wind composition and to understand differences between different collectors.

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