Table S1. Main element oxide contents by XRF (wt%), trace element and REE contents (ppm, µg·g 1) by HR-ICP-MS, and relative standard deviations (%RSD) for reference materials JH-1, JB-3, BHVO-1, UB-N. Fe_2O_3T represents total iron content. Certified values from GEOREM (http://georem.mpch-mainz.gwdg.de). Further explanation in text.

material	JB-3			JH-1		
	measured	certified	%RSD	measured	certified	%RSD
main element oxide contents in weight percent (wt%)						
SiO_2	49.621	50.960	1.882	47.997	48.180	0.269
TiO_2	1.269	1.440	8.927	0.640	0.670	3.239
Al_2O_3	17.256	17.200	0.229	5.659	5.660	0.012
Fe_2O_3T	11.060	11.820	4.698	9.957	10.270	2.188
CaO	9.752	9.790	0.275	15.111	15.020	0.427
MgO	4.561	5.190	9.126	16.831	16.730	0.426
Na_2O	2.887	2.730	3.947	0.697	0.710	1.307
K_2O	0.837	0.780	4.943	0.530	0.530	0.000
MnO	0.156	0.177	8.918	0.143	0.190	19.960
P_2O_5	0.319	0.294	5.712	0.110	0.099	7.443
analytical sum	97.399	100.087	97.314	97.565	97.960	99.596
material	**UB-N**			**BHVO-1**		
	measured	**certified**	**%RSD**	**measured**	**certified**	**%RSD**
trace element contents in ppm (µg·g^{-1})						
Sc	13.133	13.000	0.720	31.550	31.800	0.559
V	75.460	75.000	0.432	313.310	317.000	0.828
Cr	2304.915	2300.000	0.151	284.379	289.000	1.140
Co	99.771	100.000	0.162	44.692	45.000	0.485
Ni	1981.532	2000.000	0.656	121.078	121.000	0.045
Cu	28.044	28.000	0.110	134.792	136.000	0.631
Zn	79.246	85.000	4.954	97.326	105.000	5.364
Ga	3.013	3.000	0.301	21.184	21.000	0.617
Rb	4.064	4.000	1.117	11.031	11.000	0.201
Sr	9.112	9.000	0.872	406.294	403.000	0.576
Y	2.505	2.500	0.134	27.608	27.600	0.020
Zr	3.911	4.000	1.583	178.530	179.000	0.186
Nb	0.047	0.050	3.818	18.949	19.000	0.190
Cs	10.032	10.000	0.229	0.129	0.130	0.447
Ba	27.292	27.000	0.762	140.246	139.000	0.631
Hf	0.101	0.100	0.519	4.416	4.380	0.582
Ta	0.020	0.020	0.171	1.230	1.230	0.027
Th	0.068	0.070	1.789	1.098	1.080	1.151
U	0.067	0.070	3.501	0.430	0.420	1.685
analytical sum	4642.333	4660.810	99.603	1838.272	1851.640	99.278
rare-earth element (REE) contents in ppm (µg·g^{-1})						
La	0.348	0.350	0.453	15.811	15.800	0.049
Ce	0.800	0.800	0.034	39.131	39.000	0.238
Pr	0.119	0.120	0.387	5.703	5.700	0.032
Nd	0.596	0.600	0.508	25.308	25.200	0.302
Sm	0.193	0.200	2.341	6.219	6.200	0.220
Eu	0.082	0.080	1.665	2.075	2.060	0.512
Gd	0.303	0.300	0.593	6.487	6.400	0.958
Tb	0.057	0.060	3.288	0.976	0.960	1.177
Dy	0.381	0.380	0.232	5.275	5.200	1.007
Ho	0.093	0.090	2.071	1.002	0.990	0.853
Er	0.281	0.280	0.315	2.421	2.400	0.610
Tm	0.042	0.050	12.489	0.337	0.330	1.567
Yb	0.282	0.280	0.387	2.043	2.020	0.808
Lu	0.044	0.050	9.613	0.294	0.290	1.036

analytical sum	3.621	3.640	99.478	113.082	112.550	100.472

Table S2 – The geochemical comparison of different high-Mg mafic rocks and boninites from various Archean and Phanerozoic tectonic setting

geochemistry	Boninites								Paleoproterozoic high-Mg norites[9]	Archaean SHMB[10]	Barberton komatiites[11]
	Dharwar[1]	Bastar[2]	Singhbhum[3]	Archean[4]	Abitibi[5]	Isua[6]	Phanerozoic[7]	Sukinda[8]			
main element oxide contents in weight percent (wt%)											
SiO_2	45.23–52.30	52.23–54.12	42.00–46.74	52.00–54.00	44.1–60.6	46.73–54.05	52.40–61.30	37.83-54.31	47.00–56.00	51.00–57.00	37.17-47.09
TiO_2	0.22–0.36	0.26–0.39	0.10–0.16	0.24–0.28	0.14–0.64	0.17–0.40	0.07–0.50	0.01-0.12	0.30–1.00	0.40–1.00	0.13-1.06
Al_2O_3	8.78–14.10	8.97–16.55	5.71–8.69	16.60–17.60	12.9–24.9	14.09–20.24	6.10–15.00	0.74-3.23	6.80–16.10	9.90–13.00	3.10-13.30
Fe_2O_3	9.96–12.49	7.51–10.73	7.05–8.65	8.40–9.70	6.25–13.6	8.18–11.94	7.10–11.10	3.23-10.94	8.60–13.00	9.50–11.40	10.55-12.64
MgO	12.51–24.10	8.31–13.10	30.58–32.91	7.80–8.60	3.14–24.5	6.76–16.06	4.50–21.70	32.32-47.93	5.70–21.60	9.50–16.50	25.78-35.80
trace element contents in parts per million (ppm; $\mu g \cdot g^{-1}$)											
Zr	12–23	35–50	1.00–3.10	33–41	9.7–36	12.1–25.4	8–55	0.60-7.07	37–128	41–74	4.1-166
Nb	0.34–6.26	0–1.0	0.06–1.10	1.1–1.5	0.27–1.9	1.10–0.80	0.05–2.0	0.04-0.57	1.0–8.0	2.8–3.5	0.04-1.50
Sc	14–59	31–45	16–41	35–42	32–71	26–49	29–53	2.31-15.67	22–40	28–43	3.8-32.6
V	56–141	146–187	78–161	157–174	130–270	162–306	131–343	10.05-150.56	120–312	147–208	73-315
Yb	1.10–2.25	0.80–1.10	0.38–0.75	1.09–1.67	1.13–3.62	0.94–1.84	0.30–2.40	0.08-0.75	–	1.88	0.18-1.18
selected element ratios											
Mg#	70–82	66–74	80–83	62–67	51–83	61–77	42–76	78-93	56–80	69–75	84-87
Al_2O_3/TiO_2	29–50	28.03–63.65	48.50–67.42	62–67	26–100	44–93	27–133	27.0-74.05	13–34	20–30	10.0-59.0
CaO/Al_2O_3	0.81–1.00	0.35–1.38	0.36–1.08	–	–	–	–	0.016-1.24	–	–	0.3-1.3
$(Gd/Yb)_N$	0.56–0.66	1.03-1.38	0.44–0.59	–	0.3–0.7	–	–	0.47-3.71	–	–	0.4-1.1
Ti/Zr	78–113	44.54–51.84	286.72–839.30	40–44	60–110	59–112	22–163	10.74-215.33	26–87	44–85	20.94-190.05
Ti/V	11–33	10.26–13.59	4.83–6.98	9–10	5.90–16.00	–	3–15	0.83-19.23	9–23	13–24	6.58-23.79
Ti/Sc	27–115	42.62–75.42	20.61–40.14	34–45	–	–	11–84	7.14-83.72	70–211	73–125	40.36-914.87
Th/Ce	0.03–0.12	0.13-0.22	0.02–0.12	–	–	–	–	0.03-0.17	–	–	0.020-0.188

references: 1,3:[103,46]; 2,7:[104]; 4:[104]; 5:[124]; 6: [102];10: [64]; 11:[112]; 8:**this study**; 9;[58,59,162,163].

Table S3: Calculated parental melt of the Sukinda ultramafic complex chromites and chemical characteristics of boninites compared with other Archean-Paleoproterozoic mafic-ultramafic magmas of Peninsular India and primitive melts of different tectonic settings.

cratons and tectonic setting	Al_2O_3 wt% in melt	TiO_2 wt% in melt	references
	Singhbhum craton		
Sukinda chromites, Kaliapani area	(09.93-12.82)	(0.20-0.33)	**this study**
Sukinda chromites, Kathpal area	(11.02-13.05)	(0.27-0.54)	**this study**
Nuasahi chromites	10.3-11	-	[10]
Malangtoli boninites	8.46–10.11	0.30–0.36	[46]
Roro-Jojohatu boninite (SSZ)	9.67 to 11.03	-	[164]
Boninitic dykes, SinghbhumGranitoid Complex.	9.65–12.32	0.27–0.5	[165]
Tua-Dungri komatiites	1.36–2.95	0.39–0.56	[35]
	Baster Craton		
Sonakhan Greenstone Belt (SGB) chromites	10.75–12.52	0.26–1.19	[78]
SGB SHMB	8.05–12.88	0.62–0.79	[78]
Southern Bastar boninite	12.70–14.48	0.46–0.95	[104]
Southern Bastar SHMB	8.11–16.55	0.26–1.11	[114]
Dongargarh SHMB	2.55	0.50	[101]
	Dharwar Craton		
Nuggihalli chromites	8.39	0.63	[166]
Gadwal greenstone belt boninites	8.78–14	0.24–0.36	[103]
Kushtagi-Hungund greenstone belt boninites	13.45–16.26	0.56–0.59	[167]
Kushtagi-Hungund greenstone belt high-Mg basalts	8.27–12.42	0.64–0.88	[167]
Kalyadi belt Komatiitic basalts	4.95–7.9	0.27–0.4	[168]
Nagamangala greenstone belt komatiites	3.71–5.32	0.22–0.36	[169]
Banasandra komatiites	3.5–17.42	0.06–0.42	[170]
Sigegudda greenstone terrane komatiites	5.53–14.13	0.29–0.40	[171]
Sandur Superterrane komatiites	6.37–7.48	0.3–0.4	[172]
	Bundelkhand Craton		
Mauranipur basaltic komatiite	12.56–14.72	0.65–0.73	[173]
Pindar ultramafic rocks	2.0–8.3	0.2–0.5	[174]
Boninites (SSZ)	10.60–14.40	0.10–0.52	[80]
MORB	~15	0.32–2.20	[68]

BABB	~17	0.45–1.45	[68],[86]
Bir Tuluha ophiolite	10.67 - 11.56	0.33 - 0.36	[175]
Chromitites (Oman)	11.8–12.9	0.23–0.34	[75]
SED Egypt	9.12–12.12	0.42–0.79	[176]