

Color Genesis of Brown Diamond from the Mengyin Kimberlite, China

Gai-Chao Wu ^{1,2,3}, Xiao-Yan Yu ^{2,3,*}, Fei Liu ^{2,4,5,6,*}, Hai-Bo Li ⁷, Zheng-Yu Long ³, Hui Wang ^{1,3}

1 Beijing Institute of Economic and Management, Beijing 100102, China; wu.g.c@126.com (G.-C.W.), 88939535@qq.com (H.W.)

2 State Key Laboratory of Geological Processes and Mineral Resources, China University of Geosciences, Beijing, 100083, China;

3 School of Gemology, China University of Geosciences, Beijing 100083, China; zhengyulong@email.cugb.edu.cn

4 Southern Marine Science and Engineering Guangdong Laboratory (Guangzhou), Guangzhou 511458, China

5 Shandong Academician Workstation of Diamond Mineralization Mechanism and Exploration, Shandong No. 7 Exploration Institute of Geology and Mineral Resources, Linyi 276006, China

6 Key Laboratory of Deep-Earth Dynamics, Institute of Geology, Chinese Academy of Geological Sciences, Beijing 100037, China

7 National Gems & Jewelry Technology Administrative Center, Beijing 100013, China lib@ngtc.cm.cn

* Correspondence: yuxy@cugb.edu.cn (X.-Y.Y.); lfhy112@126.com (F.L.)

Table S1. Slice sample features of brown diamonds from the Mengyin deposit.

Specimen No.	Weight (ct)	Thickness (mm)	Maximum diameter (mm)	Color	Main features
MY-03	0.060	0.77	4.14	Colorless	A few cracks inside and black inclusions
MY-08	0.057	0.64	3.59	Pale yellow	Internal purity
MY-12-1	0.065	0.61	3.77	Pale yellow with a brownish tinge	Three large pinnate fissures and hexagonal black inclusions in center.
MY-12-2	0.060	0.74	3.62	Yellow with a brownish tint	Two cross-pinnate fissures inside.
MY-17	0.055	0.57	3.81	Light yellow brown	A few black inclusions and fissures inside.
MY-20	0.073	0.70	3.24	Light yellow brown	The interior is pure and the overall color distribution is uniform.
MY-21	0.073	0.80	3.38	Yellowish brown	Two V-shaped cracks with an angle of 45 ° in center, uneven brown distribution.
MY-25	0.066	0.69	3.29	Brown	A few inclusions in the center rimmed a large number of black inclusions, and uneven brown distribution.
MY-27-1	0.025	0.49	2.99	Brown	Internal purity and uneven color distribution
MY-27-2	0.020	0.52	2.31	Brown	A right-angled "V" shaped fissure inside with a small amount of black inclusions and uneven color distribution.
MY-28	0.072	0.68	3.64	Light yellow brown	A large number of cloud-like black inclusions, a small number of cracks, uneven color distribution, and a wide brown strip from the upper right to the lower left.
MY-30	0.066	0.83	2.80	Light yellow	A large number of cloud-like black inclusions with

				brown	uneven color distribution.
MY-35	0.110	0.94	3.63	Yellowish brown	Pure inside rimmed large cracks and uneven color distribution.
MY-36-1	0.060	0.60	2.88	Dark brown	Pure inside rimmed a large number of black massive and punctate inclusions and uneven color distribution.
MY-37-1	0.065	0.63	3.52	Yellowish brown	A few black inclusions, cracks and uneven color distribution inside.
MY-38	0.088	0.64	3.66	Yellowish brown	Relatively pure inside, with only a small black inclusion and uneven color distribution.
MY-40	0.054	0.67	2.77	Light yellow brown	"V" shape cracks and black inclusions inside with uneven color distribution.
MY-41	0.022	0.49	2.27	Dark Brown	Cracks in the center rimmed a large number of black inclusions and uneven color distribution.
MY-43-1	0.060	0.72	3.09	Dark yellow brown	Pure inside rimmed with a large number of massive black inclusions and obvious brown areas in the mantle.
MY-43-2	0.045	0.70	2.71	Dark yellow brown	Internal purity and uniform color distribution
MY-44	0.118	1.35	3.68	Dark yellow brown	A large number of black inclusions, fissures and brown color distribution.
MY-45	0.068	0.86	3.09	Light brown	A large number of black inclusions and cracks inside.
MY-46-1	0.065	0.78	2.69	Light brown	A few punctate black inclusions inside.
MY-46-2	0.040	0.63	2.72	Light brown	A large number of black inclusions distributed along the rim.
MY-47	0.053	0.68	2.60	Yellowish brown	Columnar black inclusions in the center rimmed blocky black inclusions, uneven color distribution
MY-48	0.051	0.64	2.90	Light yellow brown	A few punctate black inclusions in the center rimmed lumpy black inclusions.
MY-50	0.068	0.97	3.12	Light brown	A large number of black inclusions, cracks and uneven color distribution.
DB3					
DB5					

Table S2. Infrared spectrum peaks (cm⁻¹) and its type of brown diamonds from the Mengyin deposit.

Sample	Intrinsic Peak	Other spectral peaks	Type
MY-03	2368.19、2159.91、2028.77、1974.78	3106.8、2919.74、2850.31、879.39、674.97、474.41	IIa
MY-08	2364.33、2159.91、2026.84、1974.78	3236.01、3106.8、2917.81、2850.31、1427.08、1369.23、1282.45、1174.45、1095.38、1010.53、871.68、673.04、480.19	I Aab
MY-12	2364.33、2159.91、2026.84、1974.78	3106.8、2917.81、2848.38、1461.8、1369.23、1328.73、1280.52、1172.52、1097.31、1010.53、873.61、674.97	I Aab
MY-17	2368.19、2159.91、2026.84、1974.78	3106.8、2919.74、2852.24、1363.44、1282.45、1178.31、1097.31、1008.6、879.39、674.97、484.05	I Aab
MY-20	2368.19、2159.91、2028.77、1974.78	4557.02、3106.8、2919.74、2850.31、1284.38、1359.59、1176.38、1012.46、673.04	I Aab

MY-21	2364.33、2159.91、 2028.77、1974.78	1465.85、3106.8、2917.81、2850.31、 1369.23、1328.73、1170.59、1095.38、 1010.53、871.68、673.04	I Ab
MY-25	2159.91、2028.77、 1974.78、2364.33	3106.8、2919.74、2850.31、879.39、673.04	II a
MY-27	2366.26、2159.91、 2028.77、1974.78	3106.8、2917.81、2850.31、1363.44、 1328.73、1461.8、1170.59、1014.39、871.68、 674.97、460.91	IAb
MY-28	2364.33、2159.91、 2028.77、1974.78	3106.8、2921.66、2852.24、1461.8、1328.73、 1170.59、1097.31、1008.6、771.4、674.97	IAb
MY-30	2364.33、2159.91、 2028.77、1974.78	3106.8、2917.81、2850.31、1361.51、 1282.45、1176.38、1097.31、1012.46、 869.75、674.97、472.48	I Aab
MY-35	2159.91、2028.77、 1974.78	3106.8、2923.59、2852.24、1361.51、 1280.52、1174.45、1097.31、1008.6、480.19	I Aab
MY-36	2159.91、2028.77、 1974.78	3106.8、2919.74、2850.31、1361.51、 1282.45、1174.45、1097.31、1010.53、 873.61、617.12	I Aab
MY-37	2159.91、2028.77、 1974.78	3106.8、2919.74、2850.31、1365.37、 1282.45、1427.08、1176.38、1097.31、 1010.53、777.18、480.19	I Aab
MY-38	2159.91、2026.84、 1974.78	4562.81、3735.48、3667.99、3106.8、 2919.74、2850.31、1438.65、1328.73、 1363.44、1280.52、1174.45、1097.31、 1010.53、877.46、727.04	I Aab
MY-40	2159.91、2026.84、 1974.78	4531.95、3731.63、3106.8、2919.74、 2850.31、1363.44、1328.73、1280.52、 1174.45、1097.31、1010.53、478.27	I Aab
MY-41	2370.12、2159.91、 2028.77、1974.78	3106.8、2917.81、2850.31、1461.8、1282.45、 1176.38、1363.44、1321.02、1095.38、 1012.46、871.68、476.34	I Aab
MY-43	2159.91、2028.77、 1974.78	3106.8、2919.74、2850.31、1280.52、 1097.31、875.54	IAa
MY-44	2364.33、2159.91、 2028.77、1974.78	3106.8、2917.81、2850.31、1405.87、 1361.51、1282.45、1176.38、1099.24、 1012.46、873.61、669.19、474.41	IAab
MY-45	2159.91、2028.77、 1974.78	3733.56、3106.8、2921.66、2852.24、 1365.37、1280.52、1176.38、1095.38、 1008.6、727.04、480.19	I Aab
MY-46	2159.91、2028.77、 1974.78	3106.8、2919.74、2850.31、1747.21、1461.8、 867.82、472.48	II a
MY-47	2159.91、2028.77、 1974.78	3106.8、2921.66、2852.24、1461.8、1361.51、 1282.45、1178.31、1097.31、1014.39	I Aab
MY-48	2373.97、2159.91、 2028.77、1974.78	3106.8、2923.59、2852.24、1467.58、1280.52	I Aa
MY-50	2159.91、2026.84、 1974.78、1537.01、 1523.51	4495.31、3733.56、3236.01、3106.8、 2917.81、2848.38、2786.67、1432.87、 1403.94、1367.3、1328.73、1284.38、 1174.45、1097.31、1010.53、871.68、472.48	I Aab
DB3			
DB5			

Table S3. Nitrogen concents, $N_B\%$ values and model temperature of 15 I aAB-type brown diamonds from the Mengyin deposit.

Sample	N_C (ppm)	N_A (ppm)	N_B (ppm)	N_T (ppm)	$N_B\%$	T (°C)	N_sumsqu	I_3107	H_area_ana
Diamonds with the age of ~3.0 Ga									
MY-08	nan	325.82	666.09	991.91	67.15	1130.29	5342.84	2.78	31.40
MY-12	nan	7.96	411.86	419.82	98.11	1237.15	76.81	1.00	11.36
MY-17	nan	325.6	226.28	551.88	41.00	1118.44	739.95	0.32	4.34
MY-20	nan	18.98	6.94	25.92	26.78	1178.59	14.57	0.14	1.95
MY-30	nan	95.94	91.95	187.89	48.94	1152.64	98.95	0.36	4.55
MY-35	nan	72.12	204.98	277.09	73.97	1170.35	269.46	0.67	7.23
MY-36	nan	89.57	108.89	198.45	54.87	1157.24	88.76	0.64	7.25
MY-37	nan	185.77	288.12	473.90	60.80	1141.61	845.38	0.31	3.46
MY-38	nan	32.83	285.47	318.30	89.69	1195.95	506.54	0.84	11.59
MY-40	nan	89.12	171.51	260.63	65.81	1161.96	177.46	0.71	7.26
MY-41	nan	104.52	141.39	245.91	57.50	1154.53	562.34	1.05	16.05
MY-44	nan	49.88	35.91	85.79	41.86	1165.22	8.13	0.44	4.64
MY-45	nan	319.87	327	646.87	50.55	1123.88	1581.81	0.39	4.69
MY-47	nan	45.17	48.46	93.62	51.76	1173.20	244.89	0.25	2.70
MY-50	nan	294.87	595.14	890.01	66.87	1132.62	2037.35	11.60	144.66
Diamonds with the age of 1.8 Ga									
MY-08	nan	325.82	666.09	991.91	67.15	1141.96	5342.84	2.78	31.40
MY-12	nan	7.96	411.86	419.82	98.11	1250.68	76.81	1.00	11.36
MY-17	nan	325.60	226.28	551.88	41.00	1129.91	739.95	0.32	4.34
MY-20	nan	18.98	6.94	25.92	26.78	1191.08	14.57	0.14	1.95
MY-30	nan	95.94	91.95	187.89	48.94	1164.68	98.95	0.36	4.55
MY-35	nan	72.12	204.98	277.09	73.97	1182.70	269.46	0.67	7.23
MY-36	nan	89.57	108.89	198.45	54.87	1169.36	88.76	0.64	7.25
MY-37	nan	185.77	288.12	473.90	60.80	1153.47	845.38	0.31	3.46
MY-38	nan	32.83	285.47	318.30	89.69	1208.74	506.54	0.84	11.59
MY-40	nan	89.12	171.51	260.63	65.81	1174.17	177.46	0.71	7.26
MY-41	nan	104.52	141.39	245.91	57.50	1166.61	562.34	1.05	16.05
MY-44	nan	49.88	35.91	85.79	41.86	1177.48	8.13	0.44	4.64
MY-45	nan	319.87	327.00	646.87	50.55	1135.44	1581.81	0.39	4.69
MY-47	nan	45.17	48.46	93.62	51.76	1185.60	244.89	0.25	2.70
MY-50	nan	294.87	595.14	890.01	66.87	1144.33	2037.35	11.60	144.66

Note: N_A and N_B are the concentration of nitrogen in the form of A and B defects, respectively; N_T is the total nitrogen content; $N_B\%$ is the proportion of aggregated nitrogen; T : temperature determined from the rate of A to B nitrogen aggregation. N_sumsqu: minimised sum of squared differences between the measured nitrogen region (1000-1400 cm^{-1}) and the sum of the fitted components; I_3107: intensity of the 3107 cm^{-1} peak; H_area_ana: analytically determined area of the 3107 cm^{-1} peak.

Table S4. The low temperature photoluminescence spectrum peaks of brown diamonds from the Mengyin deposit.

Sample	Main characteristic peak (nm)	Secondary characteristic peak (nm)
MY-25	572.66(vs) 、 575.45(w) 、 612.43(w)、618.68(w)、636.39(w)	534.08(w)、562.9(vw)、566.16(vw)、578.65(w)、 579.64(w)、593.89(w) 、 596.68(w)、607.32(s)、 623.64(w)、631.28(s)、632.88(w)、649.41(s)
MY-28	572.66(vs) 、 575.92(m) 、 612.64(m)、626.89(m)、637.32(s)	535.48(vw)、552.21(vw)、562.95(vw)、579.95(w)、 595.34(m)、601.07(w)、607.32(m)、620.38(m)
MY-36-1	572.66(vs) 、 575.92(m) 、 612.53(s)、617.65(w)、637.43(m)	535.84(vw) 、 557.79(vw) 、 566.78(vw) 、 569.87(vw)、579.95(vw)、586.56(vw)、607.32(w)、 658.19(s)、667.59(s)、700.54(s)
MY-38	572.66(m)、576.02(s)、612.59(w)、 617.39(w)、626.89(w)、637.43(m)	535.89(vw) 、 539.46(vw) 、 566.21(vw) 、 579.95(vw)、601.22(w)、607.47(w)、700.12(s)
MY-40	572.66(vs) 、 575.97(w) 、 612.59(s)、617.54(w)、637.27(m)	534.39(vw)、567.6(vw)、579.95(vw)、607.32(w)、 649.77(m)、667.28(s)、679.98(s)、710.45(s)
MY-43-1	572.66(s)、575.92(m)、612.43(vs)	534.39(vw)、558.2(vw)、567.19(vw)、579.95(w)、 607.32(w)、624.05(m)、632.47(m)、640.53(m)、 667.43(s)

Note: vs (very strong); s (strong); m (medium strength); w (weak); vw (very weak)

Table S5. Raman spectrum peaks (cm⁻¹) of brown diamonds from the Mengyin deposit.

Sample	Raman peak position				
	Intrinsic peak position	Position of secondary peak (classified by origin)			
		HC bond (3120)	CN key (2084)	SiC bond (794)	Other
MY-03	1326.82(vs)				
MY-08	1326.82(vs)				
MY-12-1	1326.82(vs)				
MY-12-2	1326.82(vs)				
MY-17	1326.82(vs)				
MY-20	1326.82(vs)	3115.78(m)	2084.85(m)		
MY-21	1328.19(vs)				
MY-25	1326.82(vs)	3111.54(s)			
MY-27-1	1328.19(vs)		2080.71(s)	790.68(m)	
MY-27-2	1328.19(vs)		2073.82(s)	792.06(m)	
MY-28	1328.19(s)		2087.61(m)	792.06(w)	
MY-30	1326.82(vs)		2088.98(s)	790.68(m)	
MY-35	1328.19(s)	3117.15(m)	2083.47(m)	794.81(w)	
MY-36-1	1328.19(w)	3128.18(s)	2087.61(m)	797.57(vw)	
MY-37-1	1328.19(s)		2080.71(m)		
MY-38	1328.19(vs)		2087.61(s)	798.95(s)	
MY-40	1328.19(m)	3117.15(s)	2086.23(m)	796.19(w)	
MY-41	1328.19(s)		2083.47(m)	800.33(m)	
MY-43-1	1328.19(vs)		2072.45(s)	800.33(m)	
MY-43-2	1326.82(vs)	3124.05(s)	2086.23(m)	796.19(w)	
MY-44	1326.82(vs)		2086.23(s)	794.81(m)	2404.6(s)
MY-45	1328.19(s)				
MY-46-1	1328.19(vs)	3119.91(s)		792.06(vw)	
MY-46-2	1328.19(vs)	3117.15(s)	2084.85(M)	805.84(vw)	
MY-47	1328.19(vs)	3113.02(s)			
MY-48	1328.19(vs)	3117.15(s)		794.81(vw)	
MY-50	1328.19(vs)				

Note: vs (very strong); s (strong); m (medium strength); w (weak); vw (very weak)

Table S6. UV-Vis absorption spectrum (nm) peaks of brown diamonds from the Mengyin deposit.

Sample	Main peaks of visible absorption spectram	Color
MY-12-1	688	Pale yellow with a brownish tinge
MY-20	416、 690	Light yellow brown
MY-25	456、 686	Brown
MY-28	600、 688	Light yellow brown
MY-30	600、 688	Light yellow brown
MY-35	416、 682、 690	Yellowish brown
MY-36-1	416、 682、 688	Dark brown
MY-37-1	416、 688	Yellowish brown
MY-38	416、 688	Yellowish brown
MY-40	416、 602、 688	Light yellow Brown
MY-43-1	688	Dark yellow brown
MY-46-1	684	Light brown
MY-47	602、 688	Yellowish brown

Note: Abs-Absorbance

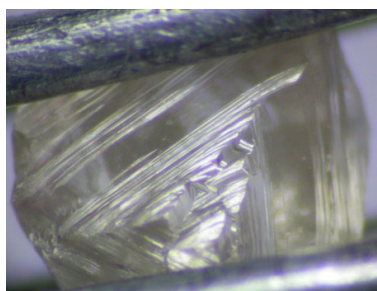
Table S7. Slip line of plastic deformation of raw brown diamonds from the Mengyin deposit.

Sample	Weight (ct)	Color	Maximum diameter (mm)	Crystal form	Number of slip lines
MY-20	0.130	Yellow	3.20	Elongated round octahedron and rhombic dodecahedron	Three groups
MY-28	0.140	Light yellow brown	3.22	Deformed rhombohedral dodecahedral fragment	Two groups
MY-29	0.135	Light yellow brown	2.58	Deformed rhombic dodecahedron	Two groups
MY-36	0.145	Yellowish brown	2.98	Rounded octahedral fragment	Three groups
MY-38	0.125	Yellowish brown	3.49	Stepped octahedral fragment	A group
MY-43	0.145	Dark yellow brown	2.41	Stepped octahedron	A group
MY-44	0.135	Dark yellow brown	2.93	Flattened rounded octahedral fragment	A group
MY-47	0.125	Light	2.18	Stepped octahedron	A group

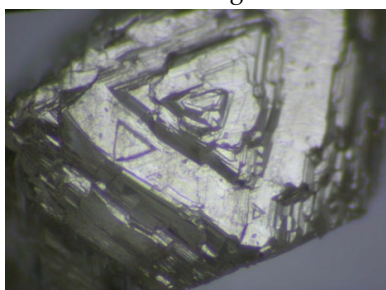
			brown			
	MY-52	0.160	Dark brown	3.12	Stepped octahedral fragment	Three groups
	MY-58	0.095	Dark brown	2.33	Rhombic dodecahedron	A group



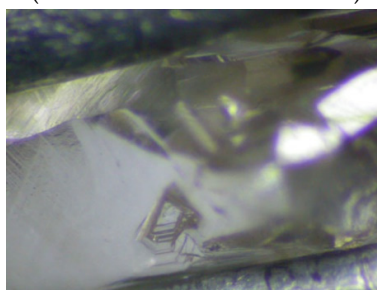
The brown diamond sample studied in this paper
(maximum diameter range 1.21 ~ 4.87 mm)



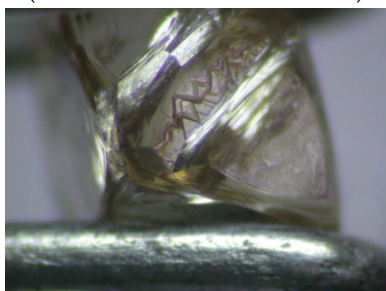
Triangular pits on the back of sample MY-07
(maximum diameter 2.50mm)



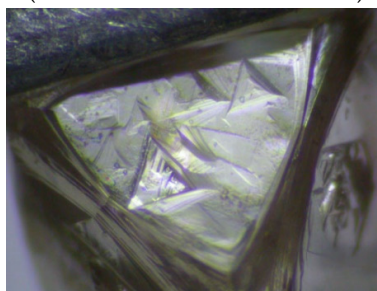
Sample MY-16 triangular pit, hexagonal pit
(maximum diameter 2.64 mm)



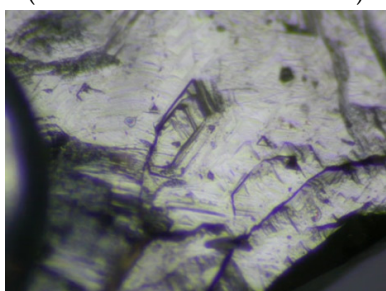
Triangular pits on the back of sample MY-17
(maximum diameter 3.10 mm)



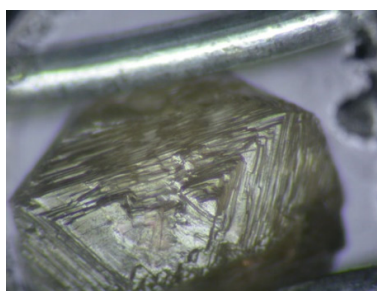
Sample MY-31 pairs of triangular indented triangular pits
(maximum diameter 2.89 mm)



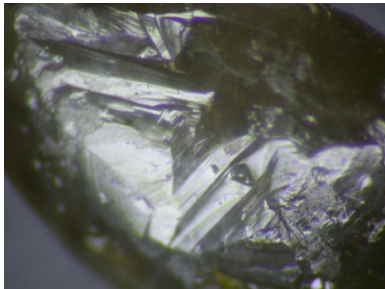
Triangular pit cluster of sample MY-31
(maximum diameter 2.89 mm)



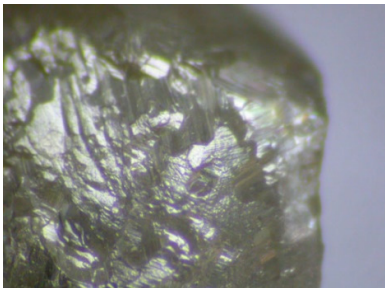
Sample MY-37 Triangular pit
(maximum diameter 3.75 mm)



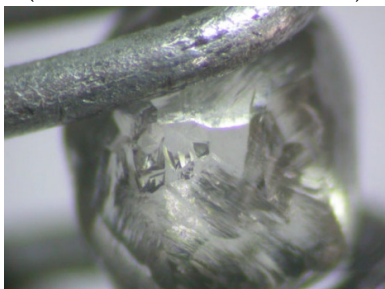
Sample MY-52 Triangular pits, three sets of stepped slip lines, imbricated etching



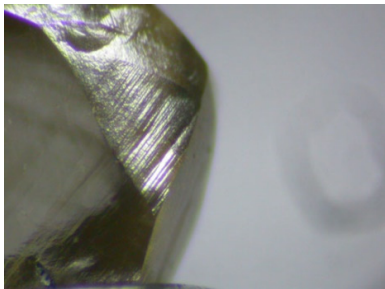
Sample MY-21 Hexagonal pit
(maximum diameter 2.60 mm)



Sample MY-12 Quadrangular pit with flat
bottom
(maximum diameter 3.01 mm)

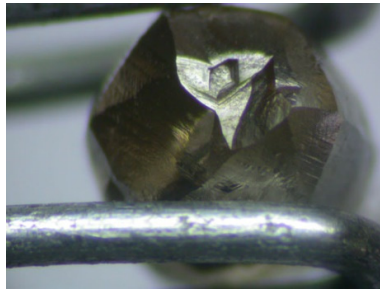


Sample MY-49 Trapezoidal Pit
(maximum diameter 2.30 mm)

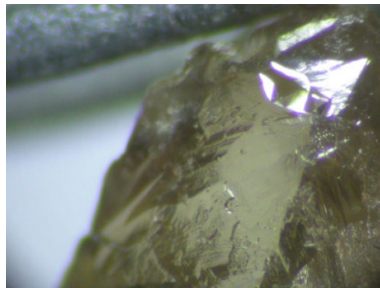


Sample MY-35 Beam Halo
(maximum diameter 2.67 mm)

(maximum diameter 3.12 mm)



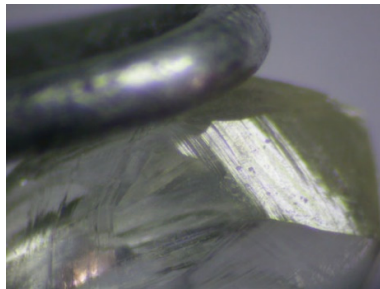
Sample MY-44 Hexagonal pit
(maximum diameter 2.93 mm)



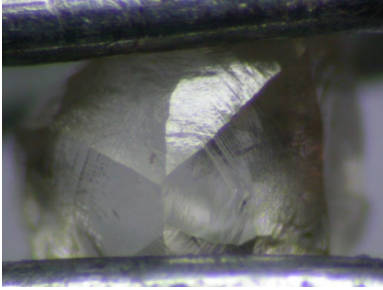
Sample MY-36 Quadrilateral Pit
(maximum diameter 2.98 mm)



Sample MY-27 Beam Halo
(maximum diameter 2.86 mm)



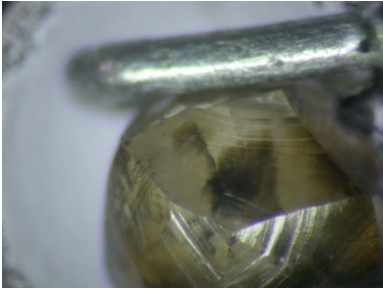
Closed halo line at exposure of cubic axis of
sample MY-08
(maximum diameter 2.65 mm)



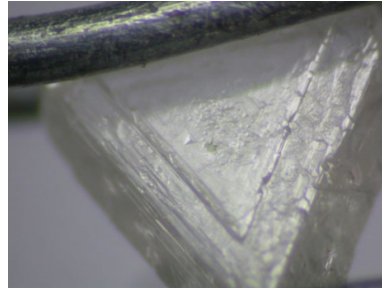
Sample MY-18 Hexagonal Closed Halo
(maximum diameter 2.31 mm)



Sample MY-50 closed halo
(maximum diameter 2.44 mm)



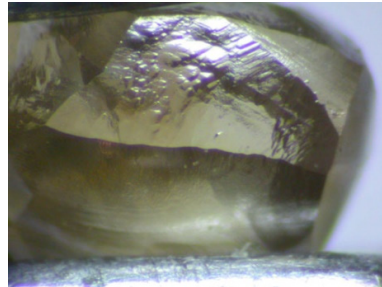
Sample MY-53 closed halo
(maximum diameter 2.56 mm)



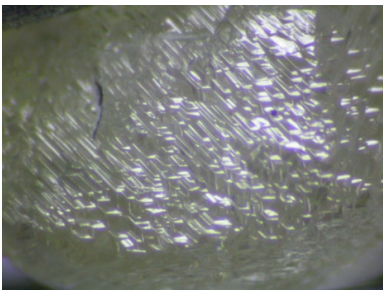
Triangular pyramidal mound of sample
MY-02 (maximum diameter 1.90 mm)



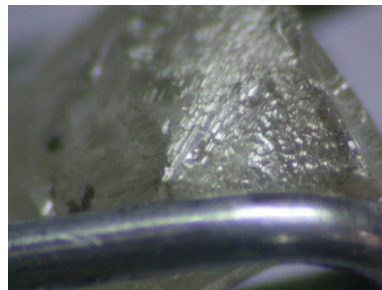
Sample MY-46 Droplet mound
(maximum diameter 2.36 mm)



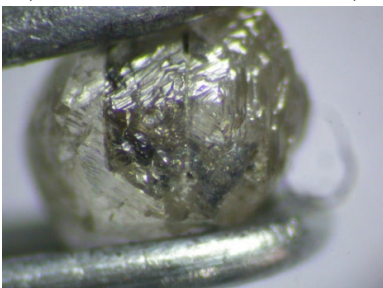
Sample MY-27 Droplet mound
(maximum diameter 2.86 mm)



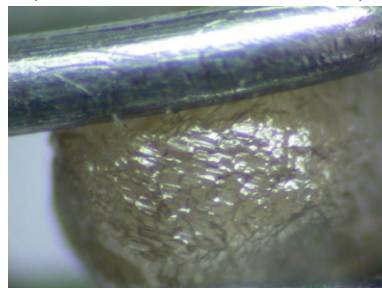
Sample MY-11 Imbricate Etch, Solution Trench
(maximum diameter 2.90 mm)



Imbricate etching of sample MY-32
(maximum diameter 3.08 mm)



The sample MY-34 is composed of dissolution



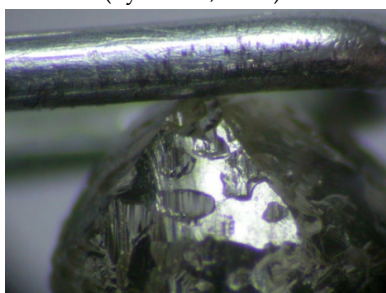
Imbricate etching of sample MY-41

cavity, dissolution pore and dissolution ditch, which are connected together. Imbricate etching

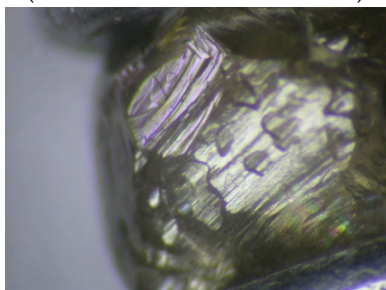
(maximum diameter 2.36 mm)



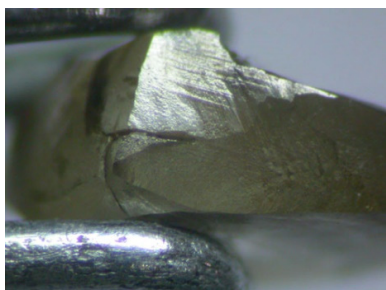
An imbricated erosion formed by the regular combination of triangular pyramidal mounds (by Orlov, 1977).



Disk-like image of sample MY-34
(Maximum diameter 2.36 mm)

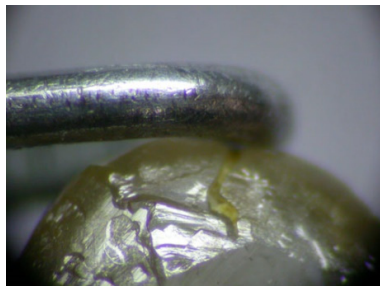


Disk-like etch image of sample MY-55
(Maximum diameter 2.05 mm)

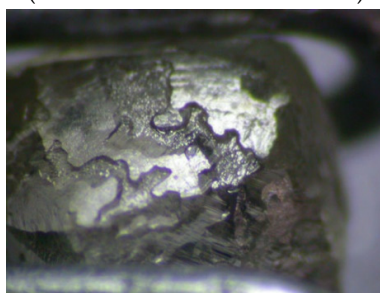


Sample MY-37 Seedling-shaped dissolution gully, two sets of cross slip lines (maximum diameter 3.75 mm)

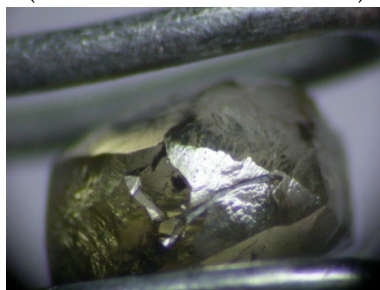
(maximum diameter 1.95 mm)



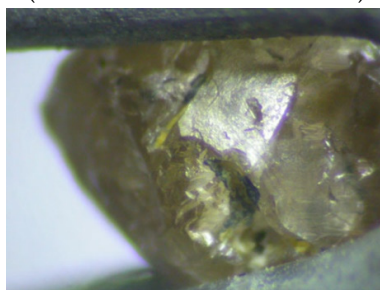
Sample MY-21: three corrosion grooves and discoid erosion figures
(maximum diameter 2.60 mm)



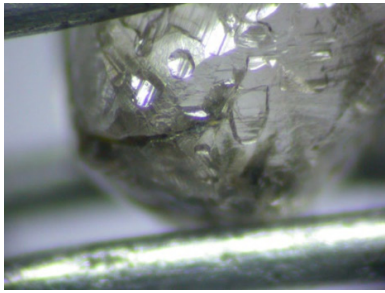
Disk-like etch image of sample MY-46
(Maximum diameter 2.36 mm)



Sample MY-33 Inverted "V" -shaped dissolution ditch
(Maximum diameter 2.48 mm)



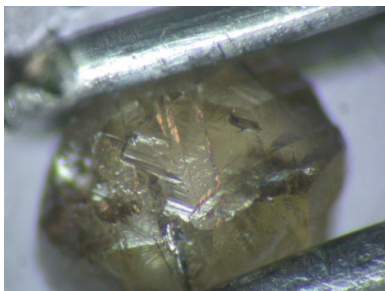
Sample MY-42 Solution Trench
(Max. diameter 1.90 mm)



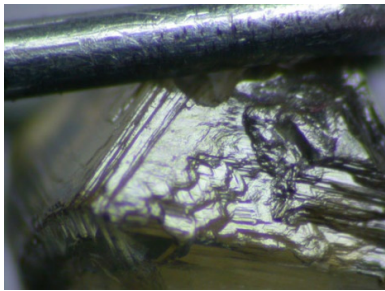
Sample MY-45 dissolution ditch and worm-like pit
(maximum diameter 2.85 mm)



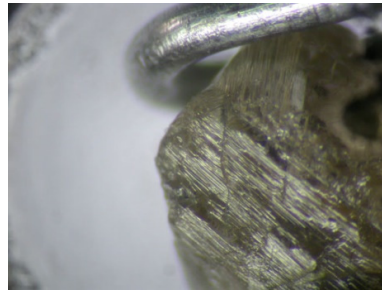
Sample MY-53: a curved corrosion groove
(maximum diameter 2.56 mm)



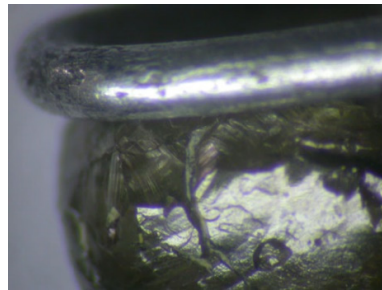
Sample MY-58 One dissolution trench
(maximum diameter 2.33 mm)



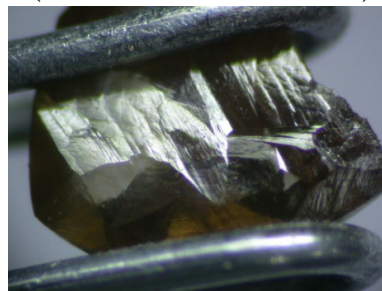
A set of step slip lines for sample MY-43
(maximum diameter 2.41 mm)



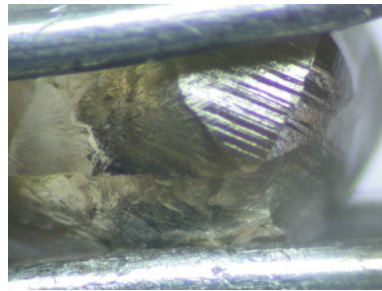
For sample MY-52, two sets of fissure-like corrosion grooves stagger the slip lines
(maximum diameter 3.12 mm).



Sample MY-55 has a very deep dissolution ditch and annular dissolution pore
(maximum diameter 2.05 mm).



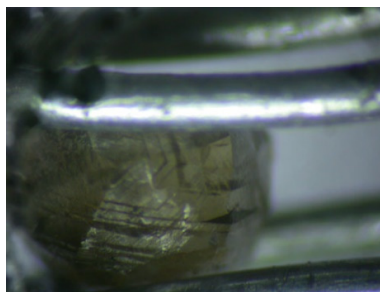
A set of slip lines for sample MY-38
(maximum diameter 3.49 mm)



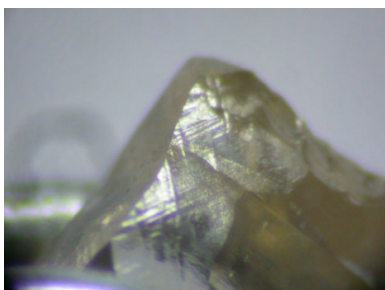
A set of slip lines for sample MY-44
(maximum diameter 2.93 mm)



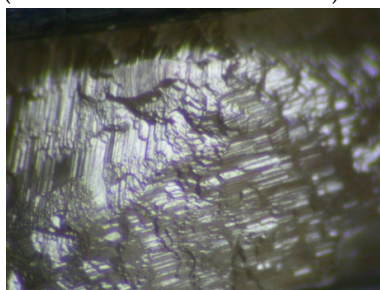
A set of step slip lines for sample MY-47
(maximum diameter 2.18 mm)



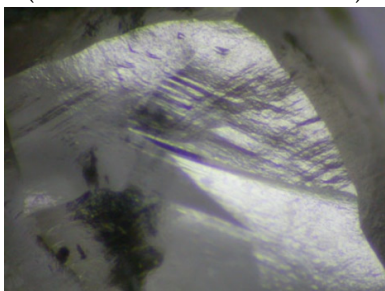
A set of slip line plots for sample MY-58
(closed trend with other fuzzy two components)
(maximum diameter 2.33 mm)



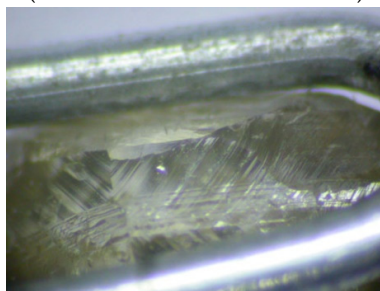
Two sets of cross slip lines for sample MY-22
(maximum diameter 2.74 mm)



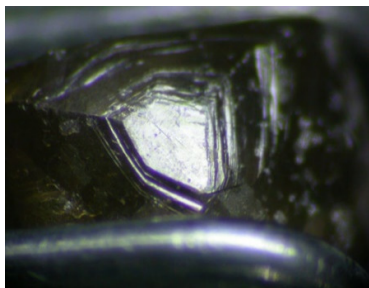
Sample MY-28 two sets of stepped slip lines
(maximum diameter 3.22 mm)



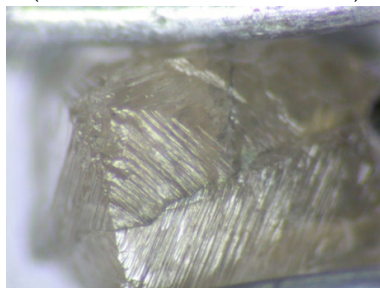
Two sets of cross slip lines for sample MY-29
(maximum diameter 2.58 mm)



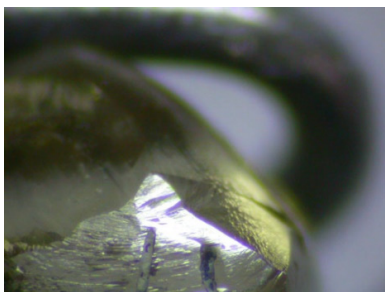
Three sets of cross slip lines for sample
MY-20
(maximum diameter 3.20mm)



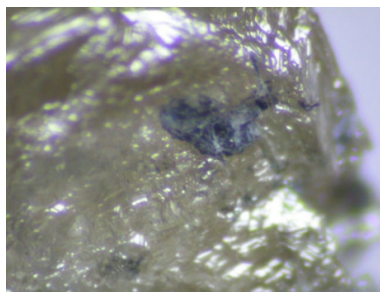
Sample MY-36 Three sets of slip lines
(Maximum diameter 2.98 mm)



Sample MY-52 three sets of slip lines
(Maximum diameter 3.12 mm)



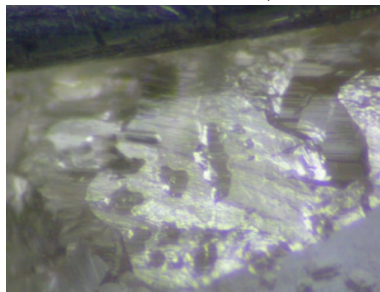
Sample MY-25 has two corrosion channels.
(maximum diameter 3.29 mm)



Sample MY-28 dissolution cavity (maximum
diameter 3.22 mm)



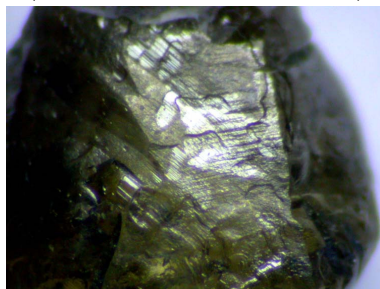
Sample MY-34 dissolution cavity
(maximum diameter 2.36 mm)



Sample MY-12 worm-like pit
(maximum diameter 3.01 mm)



Sample DB3 octahedral crystal faces are marked
by numerous negative trigons (maximum diameter
2.55mm).



Sample DB5 showing two groups of clear slip
lines cross each other on the surface, resulting in a
special lattice structure on the rounded surface
(maximum diameter 2.74mm).

FigureS1. Morphological pictures of representative rough brown diamonds from the Mengyin deposit, China.