

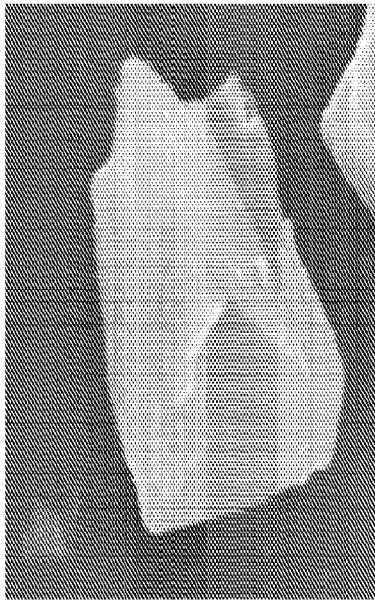


FIG. 1A

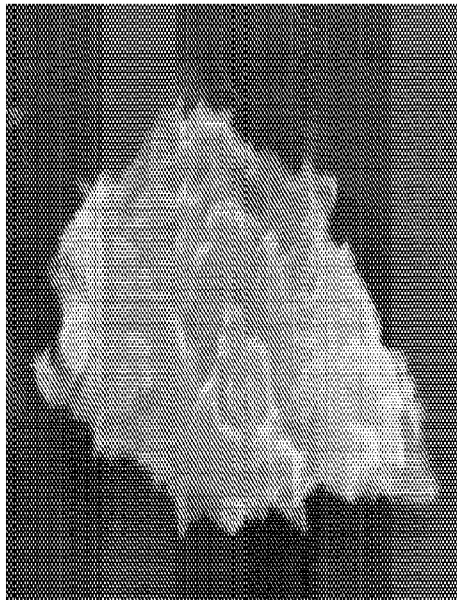


FIG. 1C

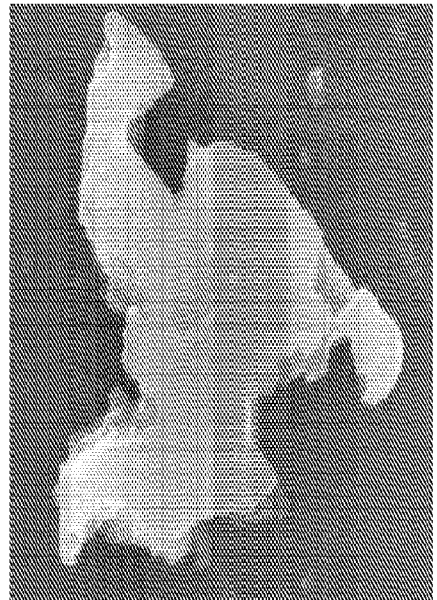


FIG. 1E

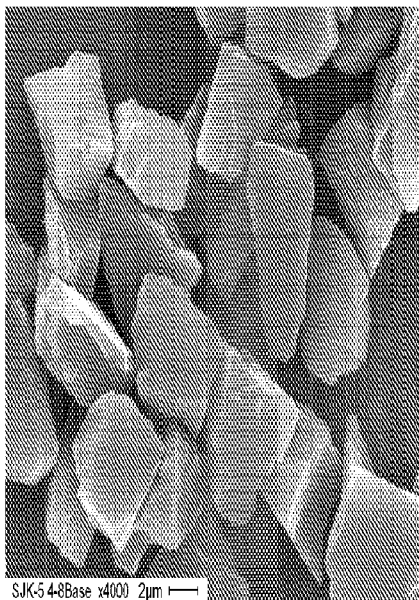


FIG. 1B

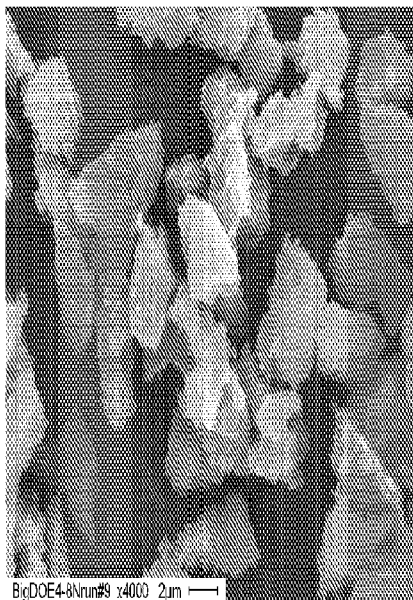


FIG. 1D

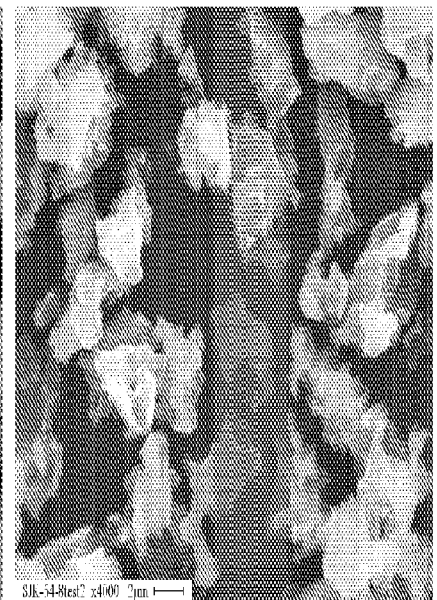


FIG. 1F

FIG. 2

Physical and Performance Data for 4-8um Diamond Powder

Sample	Weight Loss, %	Powder Mean Size, um	Specific Surface Area m ² /gram	Material Removal, mg/hr	Clemex, Roughness	Clemex, Sphericity
825C 30% Nickel (DOE #40)	35	5.6	1.29	279	0.77	0.47
900C 30% Nickel (DOE#9)	56	5.0	1.55	304	0.78	0.46
Iron-etched SJK-5 4-8um	52	5.7	1.55	276	0.68	0.34
SJK-5 4-8um Baseline	-	5.7	0.88	126	0.89	0.64
4-8um Polycrystalline	-	4.7	2.9	168	0.84	0.60

FIG. 3

Roughness Distribution of 4-8um Diamond

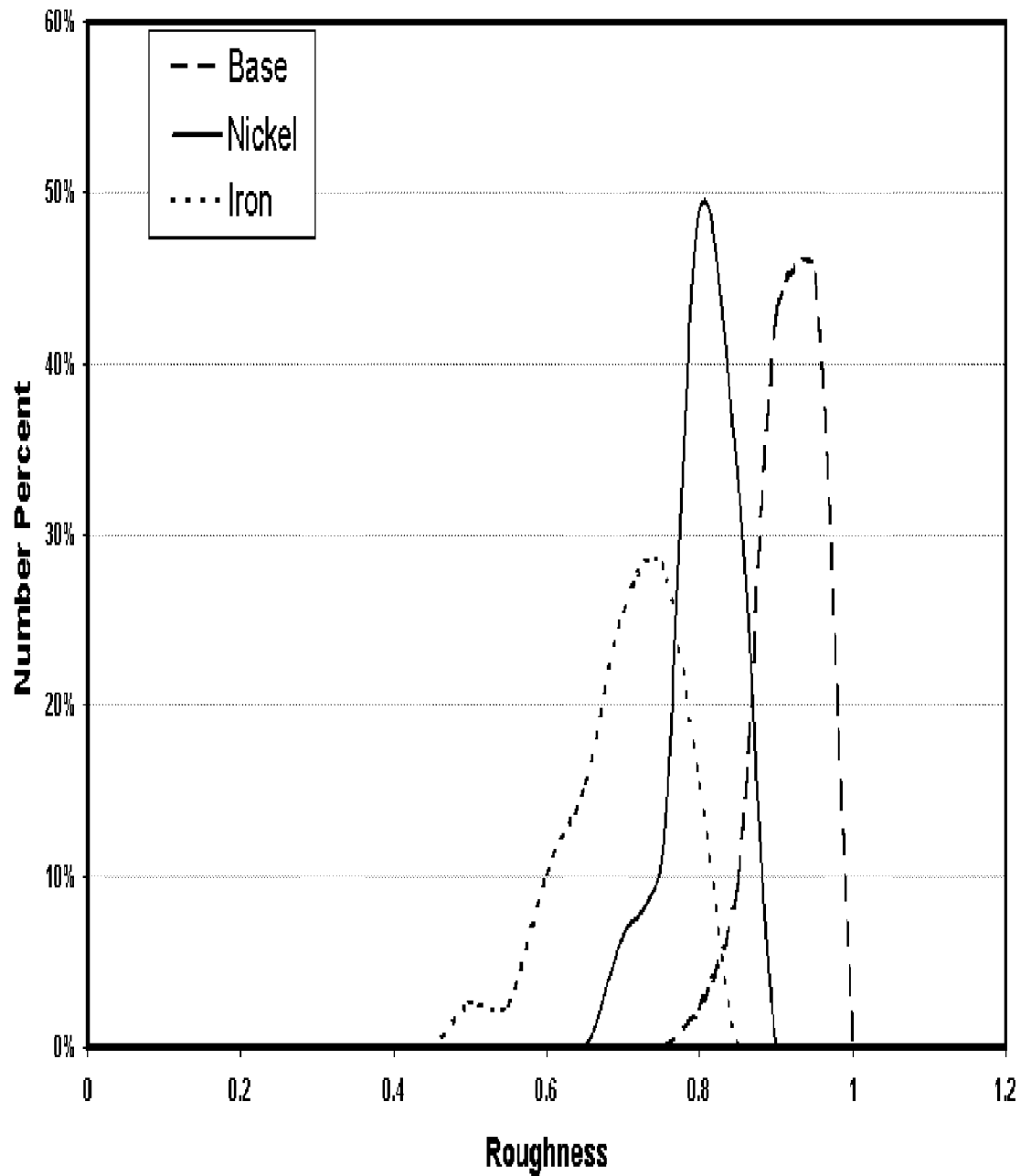


FIG. 4

Sphericity Distribution of 4-8um Diamond

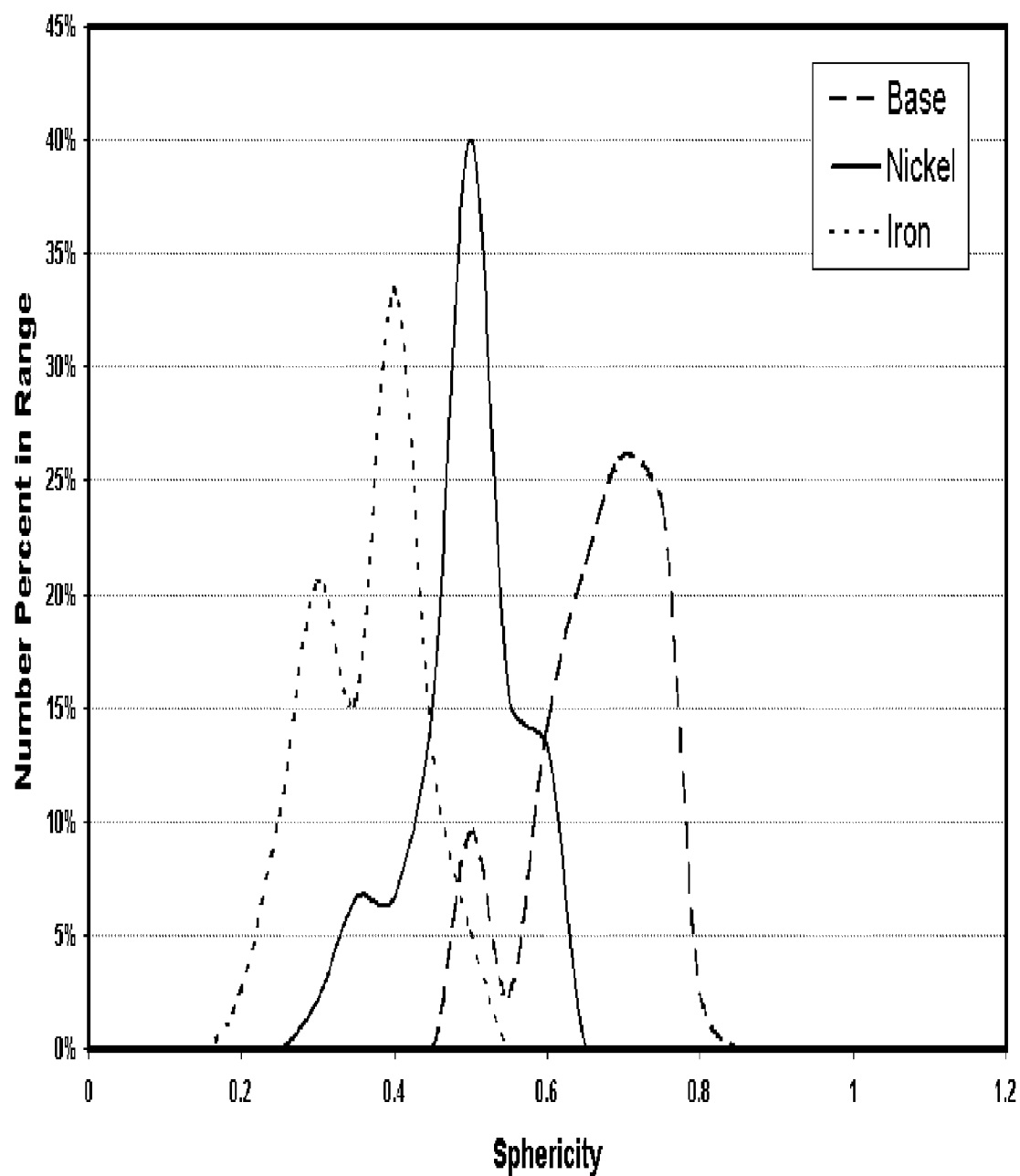
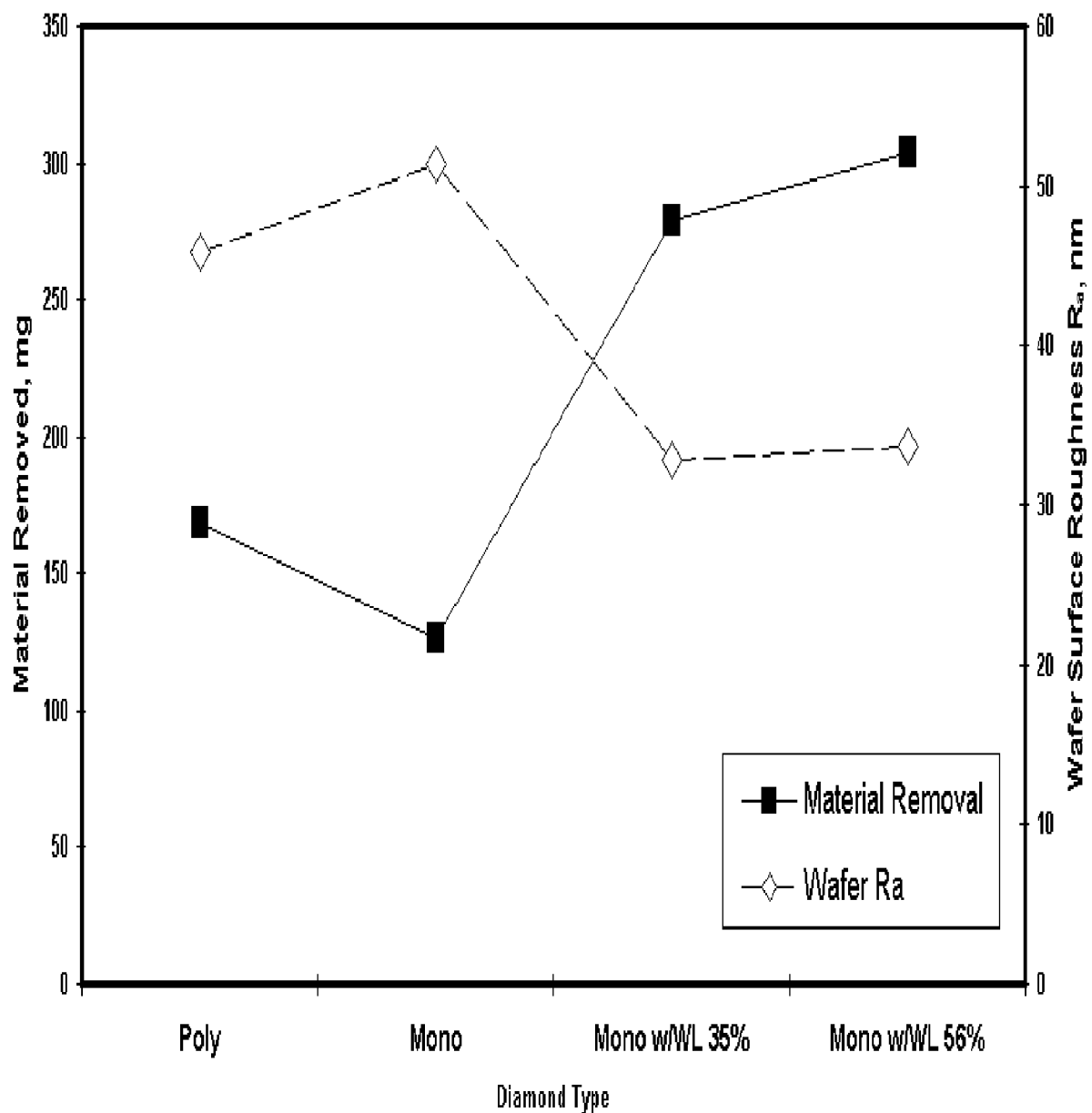


FIG. 5

Comparison of Material Removal and Wafer Surface Roughness Using
4-8um Diamond Powders in Slurry for Lapping Sapphire Wafers



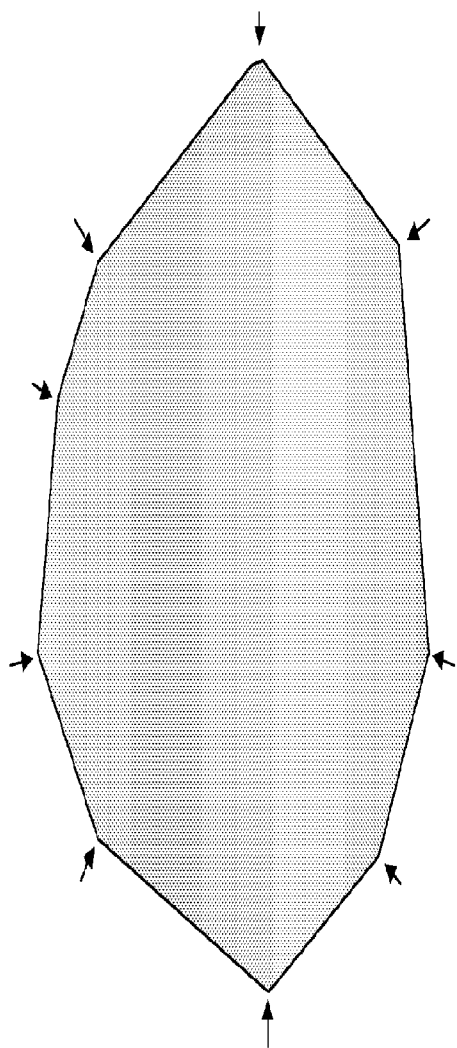


FIG. 6A

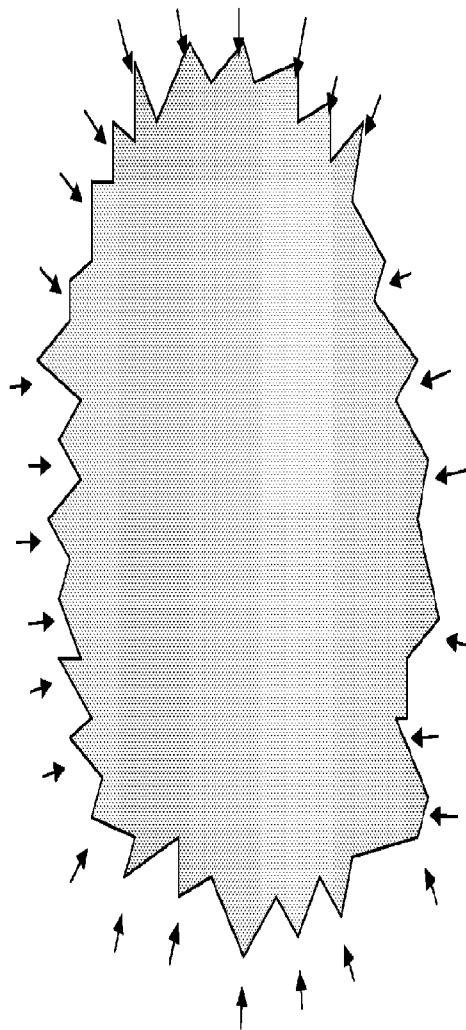


FIG. 6B

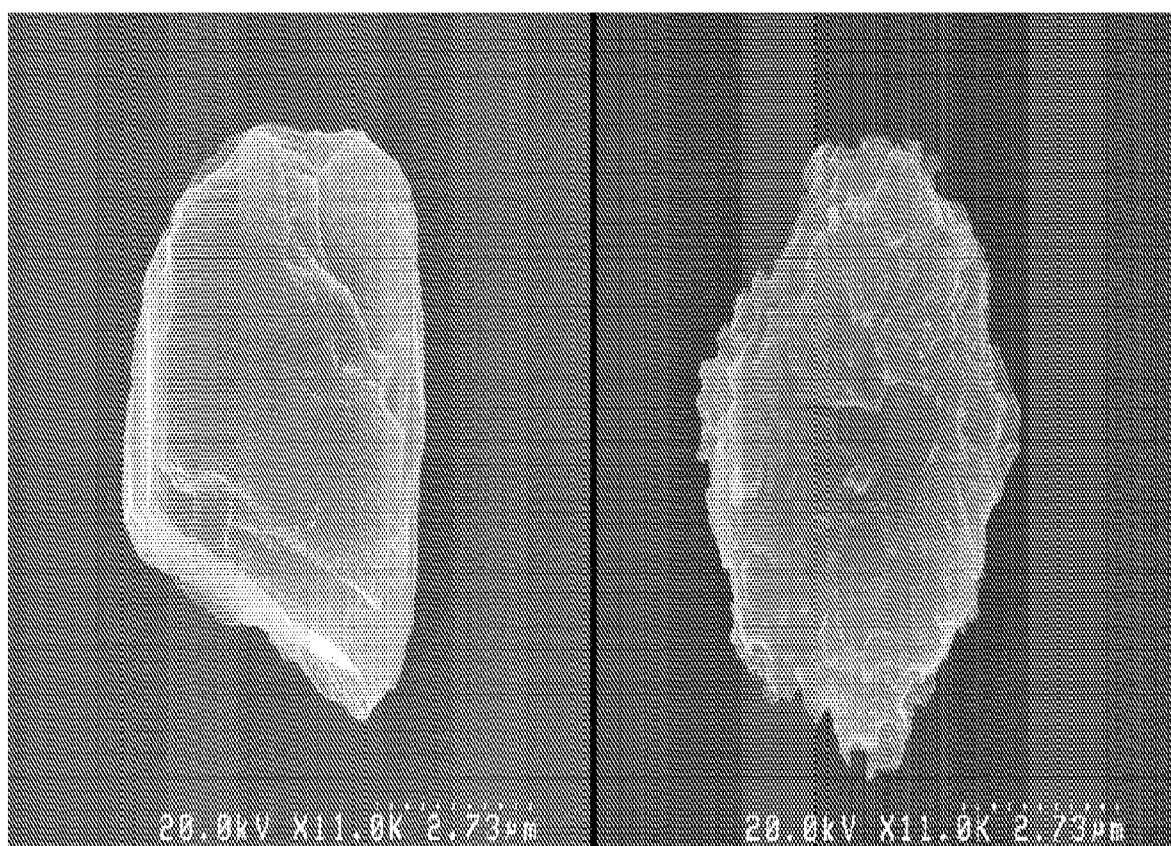


Fig. 7

Fig. 8

Fig. 9A



Fig. 9B

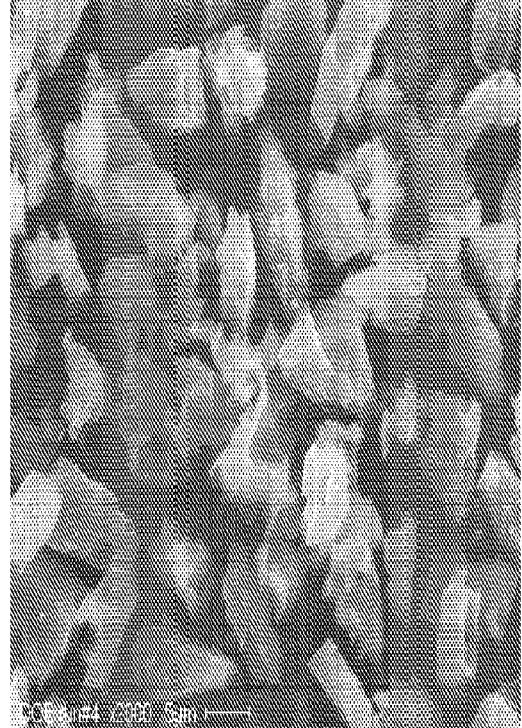


Fig. 9C

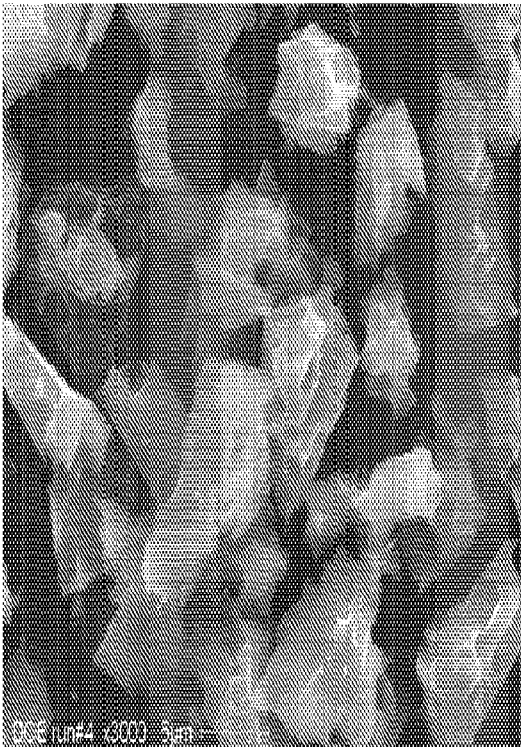


Fig. 9D



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Fig. 10A



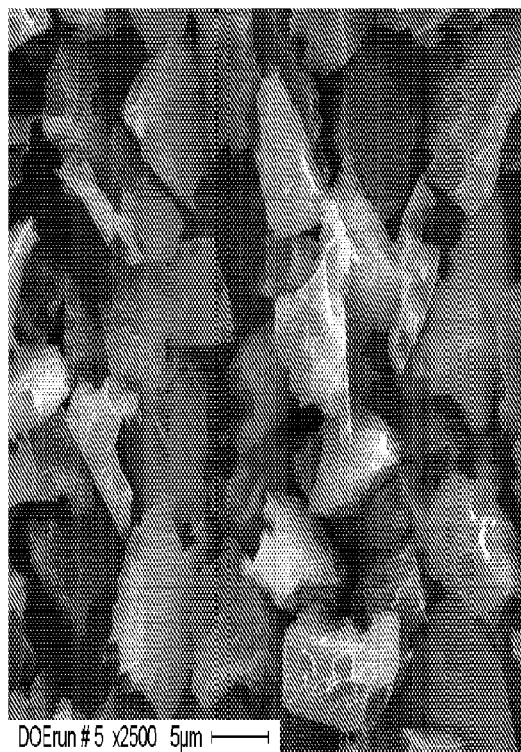
Fig. 10B



Fig. 10C



Fig. 10D



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Fig. 11A



Fig. 11B



Fig. 11C

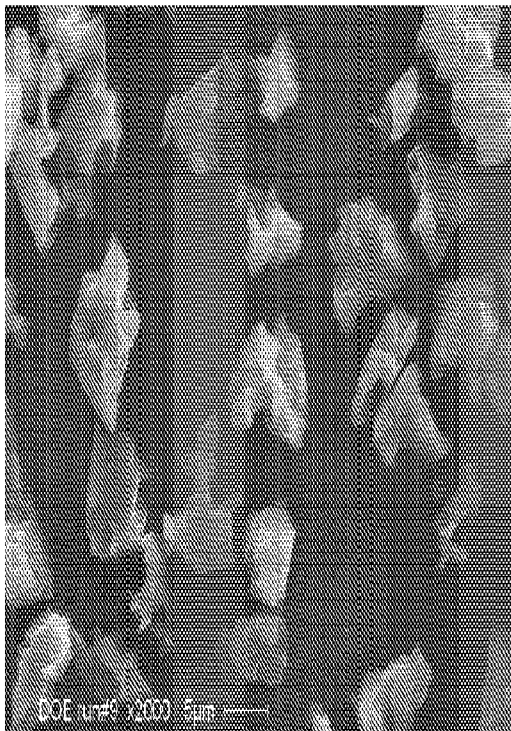


Fig. 11D



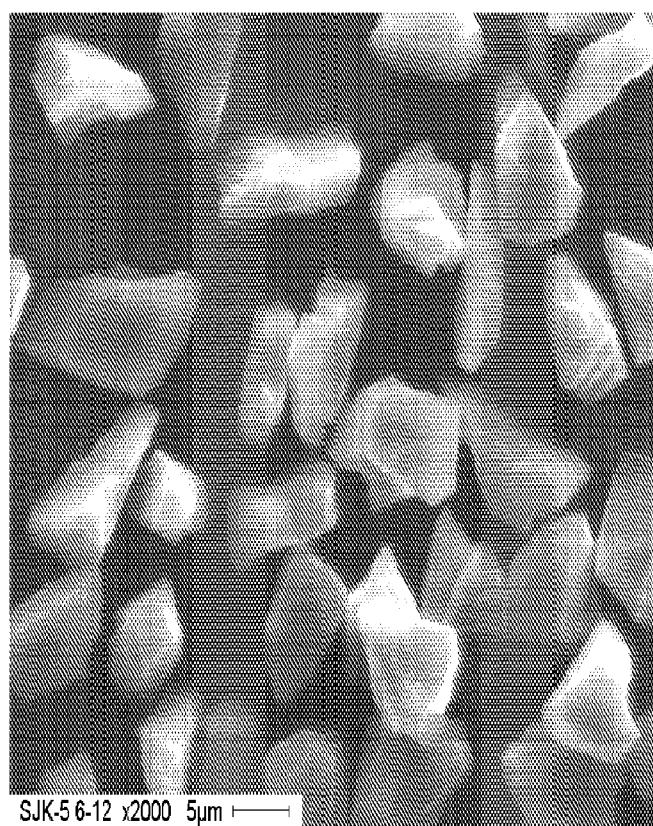


Fig. 12

Table 2

DOE Run#	Start Size (μm)	Final Size (μm)	Diamond Wt % loss	Surface Area (m^2/g)	Material Removal (mg)	Roughness	Sphericity
8	9	8.6	15	0.45	148	0.89	0.64
7	9	8.47	23	0.5	132	0.82	0.54
6	9	8.56	25	0.53	146	0.79	0.5
3	9	8.74	30	0.62	150	0.79	0.48
11	9	8.57	36	0.48	160	0.84	0.56
5	9	7.72	45	0.76	191	0.67	0.34
9	9	7.87	53	0.78	179	0.62	0.26
4	9	7.83	61	0.88	207	0.69	0.34
Reference	Mono	8.69	---	0.55	115	0.92	0.69
Reference	POLY	8.07	---	1.7	250	0.83	0.6

FIG. 13

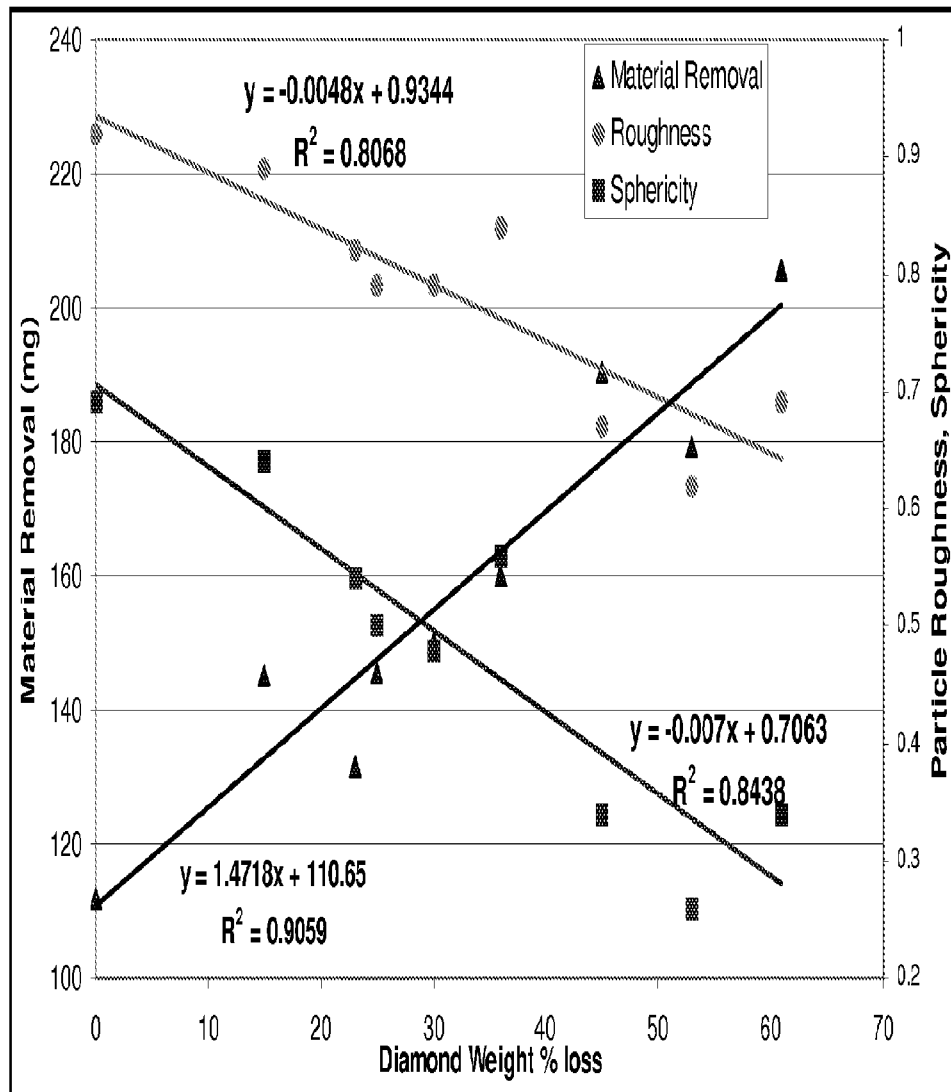


Fig. 14

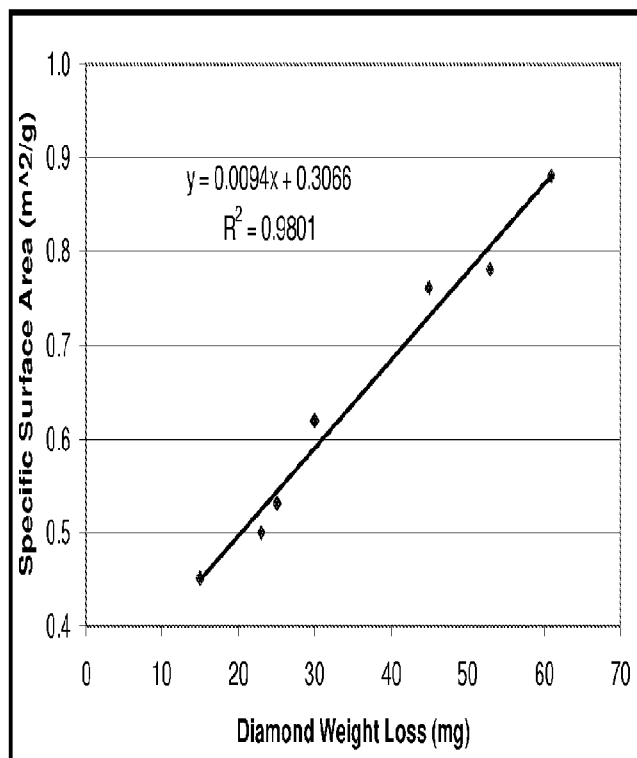


Fig. 15

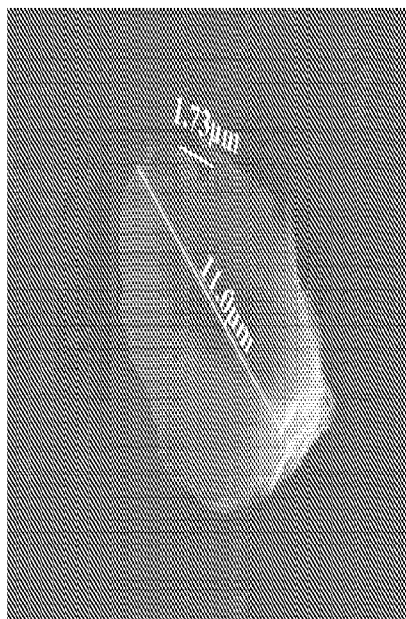


Fig. 16

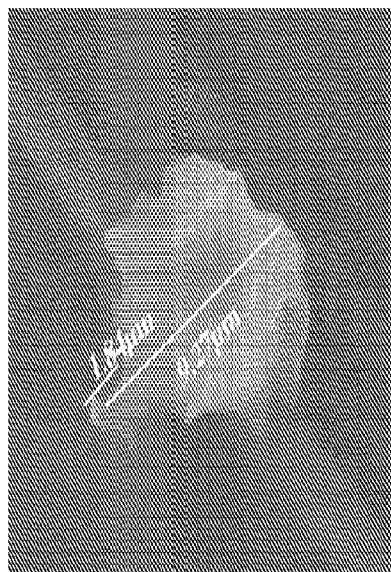


Fig. 17

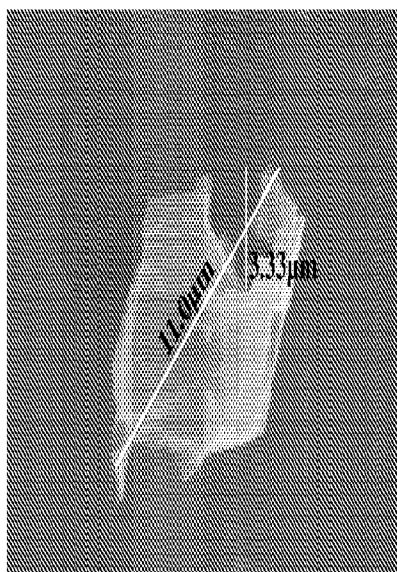


Fig. 18

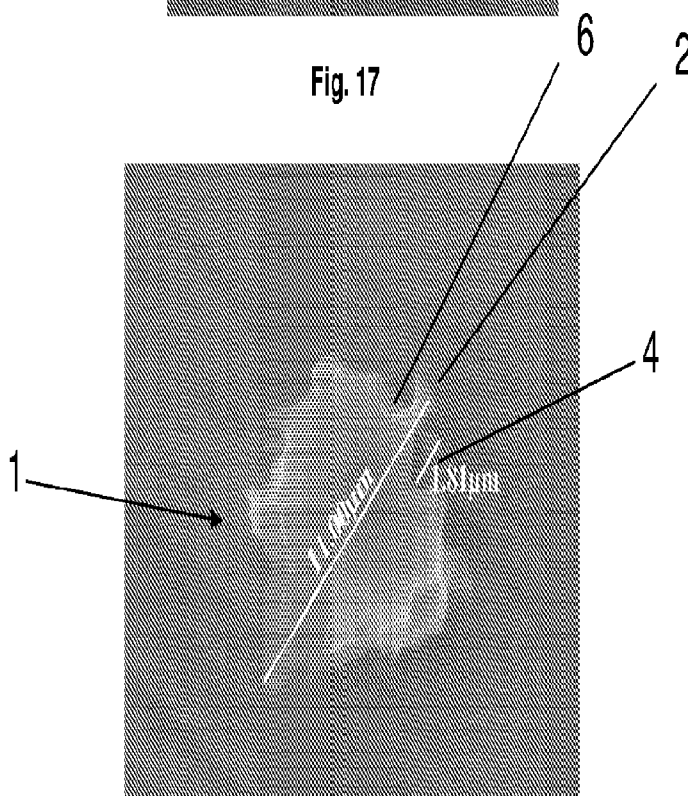


Fig. 19

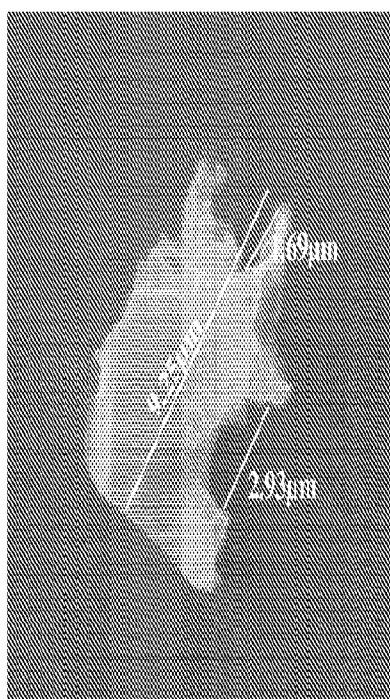


Fig. 20

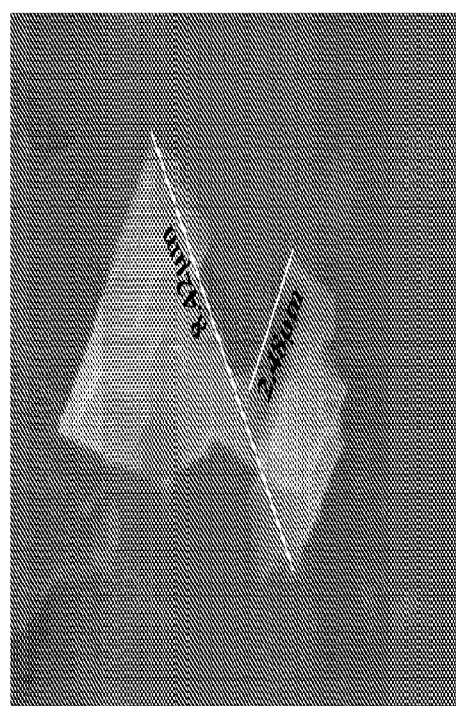


Fig. 21

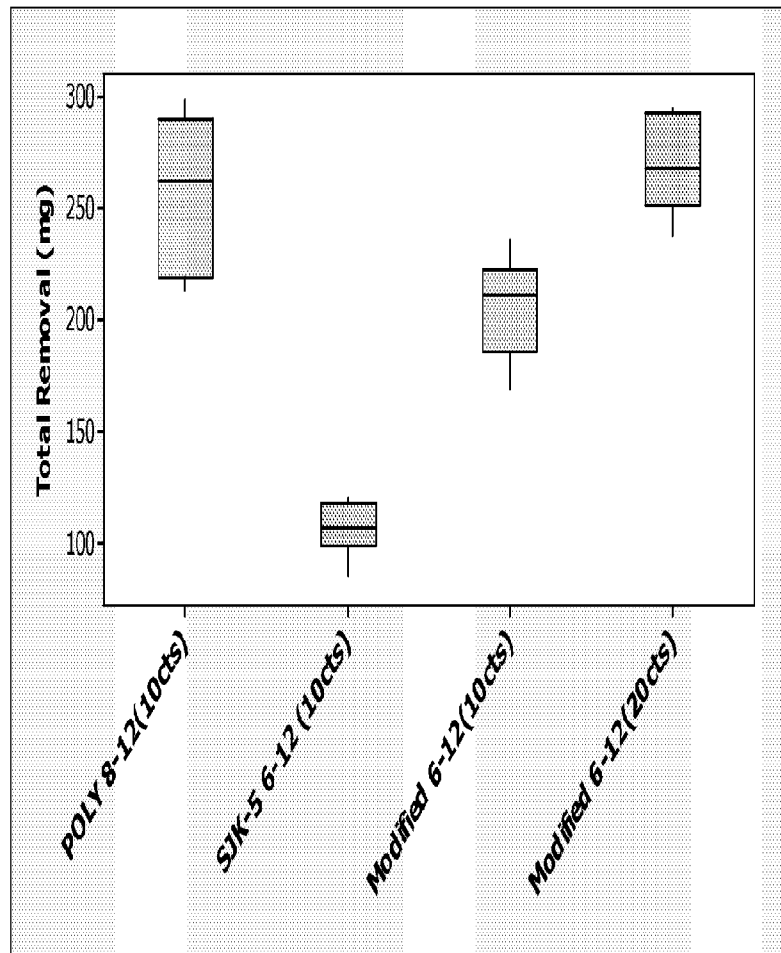


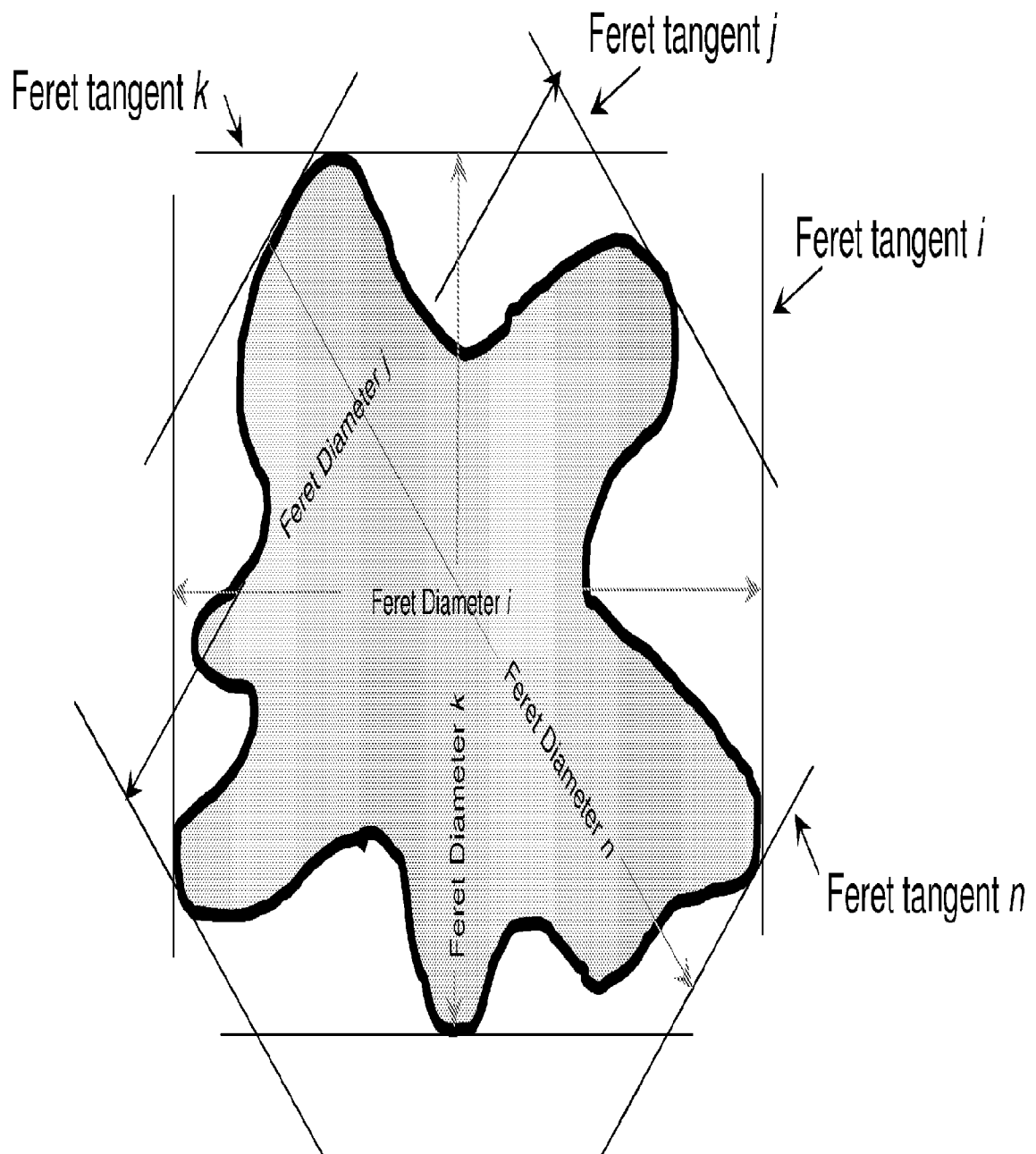
Fig. 22

Table 3

Run #	Temperature (°C)	Time (hr)	Iron % (by wt)	Diamond % (by wt)	Diamond wt% loss
8	750	1	60	40	15
7	750	2	60	40	23
6	750	1	80	20	25
3	850	1	60	40	30
11	750	2	80	20	36
5	850	1	80	20	45
9	850	2	60	40	53

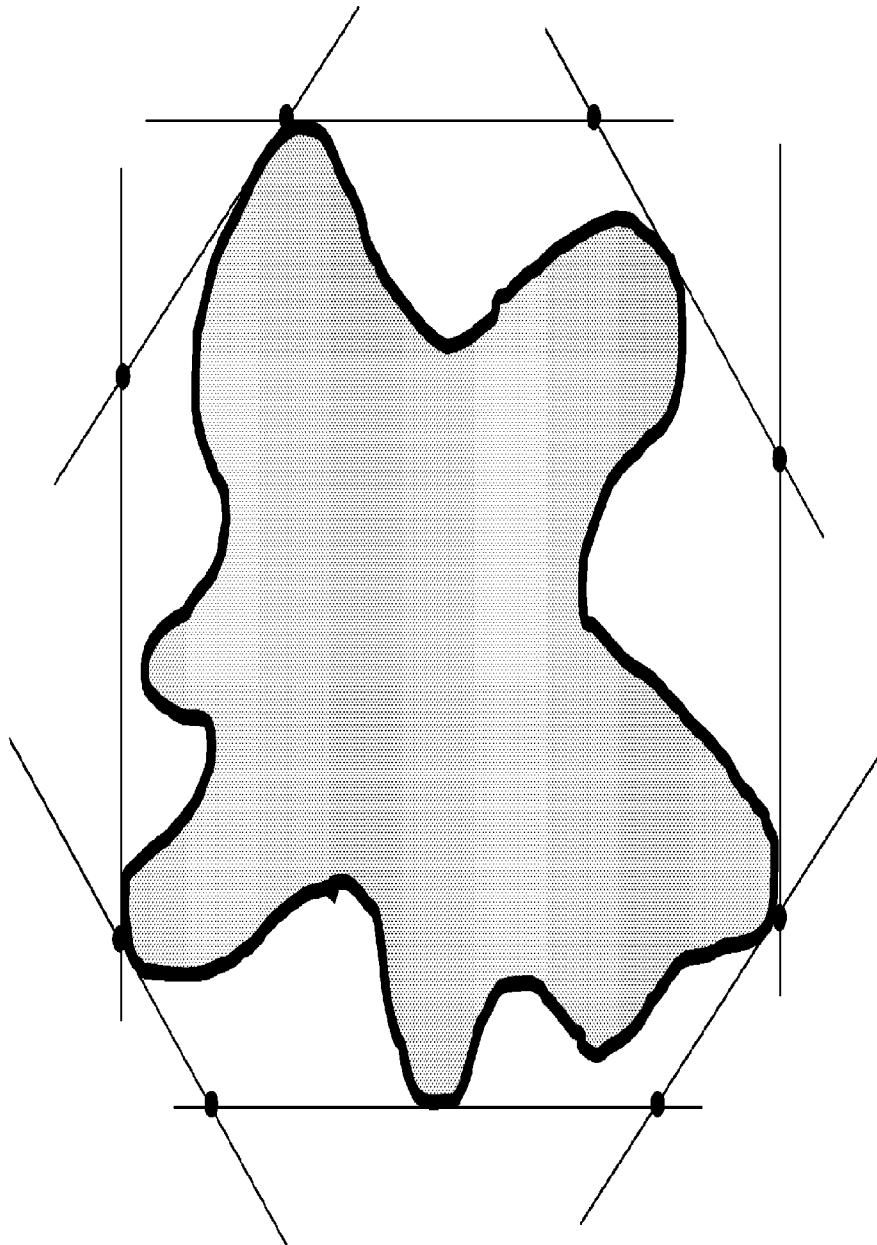
Fig. 23

Fig. 24



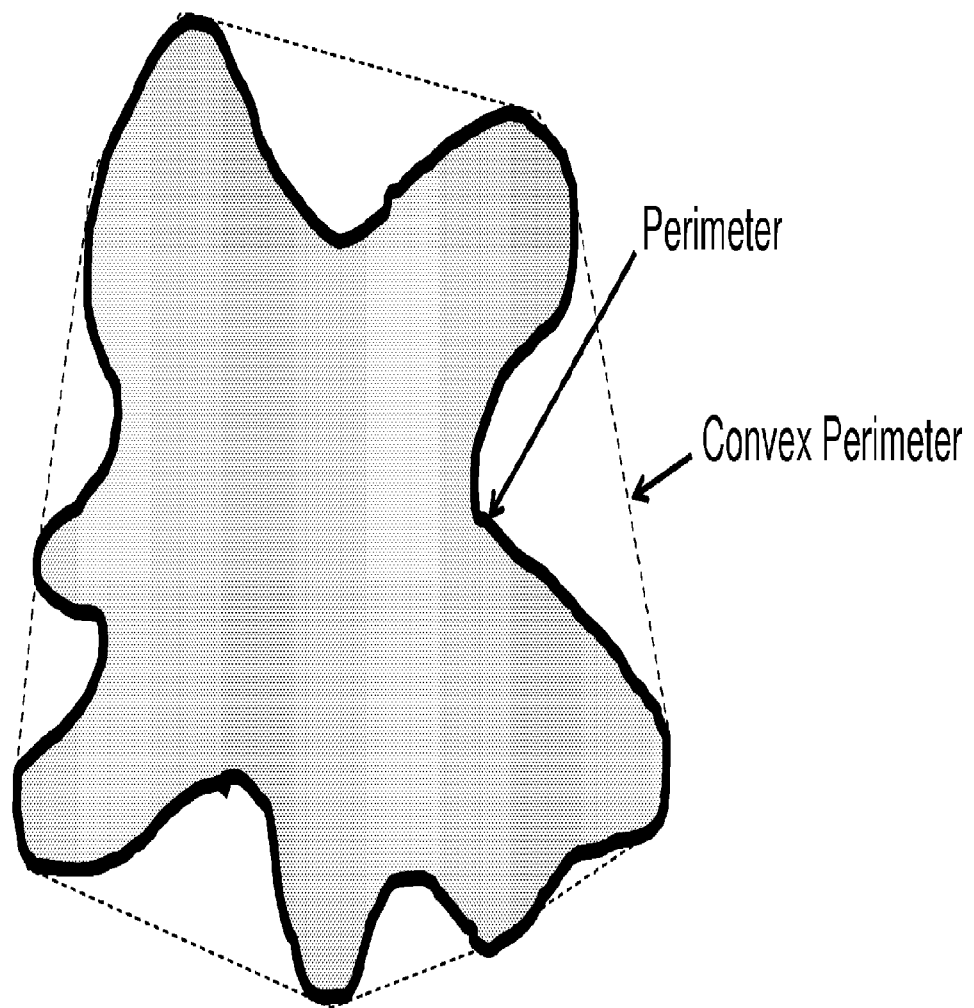
Feret diameter is defined as the distance between two parallel lines touching the boundary of a 2-dimensional image or particle profile.

Fig. 25



The convex perimeter is formed from the intersection of many feret tangent lines.

Fig. 26



$$\text{Convex perimeter} = \sum \text{Ferets } (2 \tan) \times \left(\frac{\pi}{2(\text{number of ferets})} \right)$$

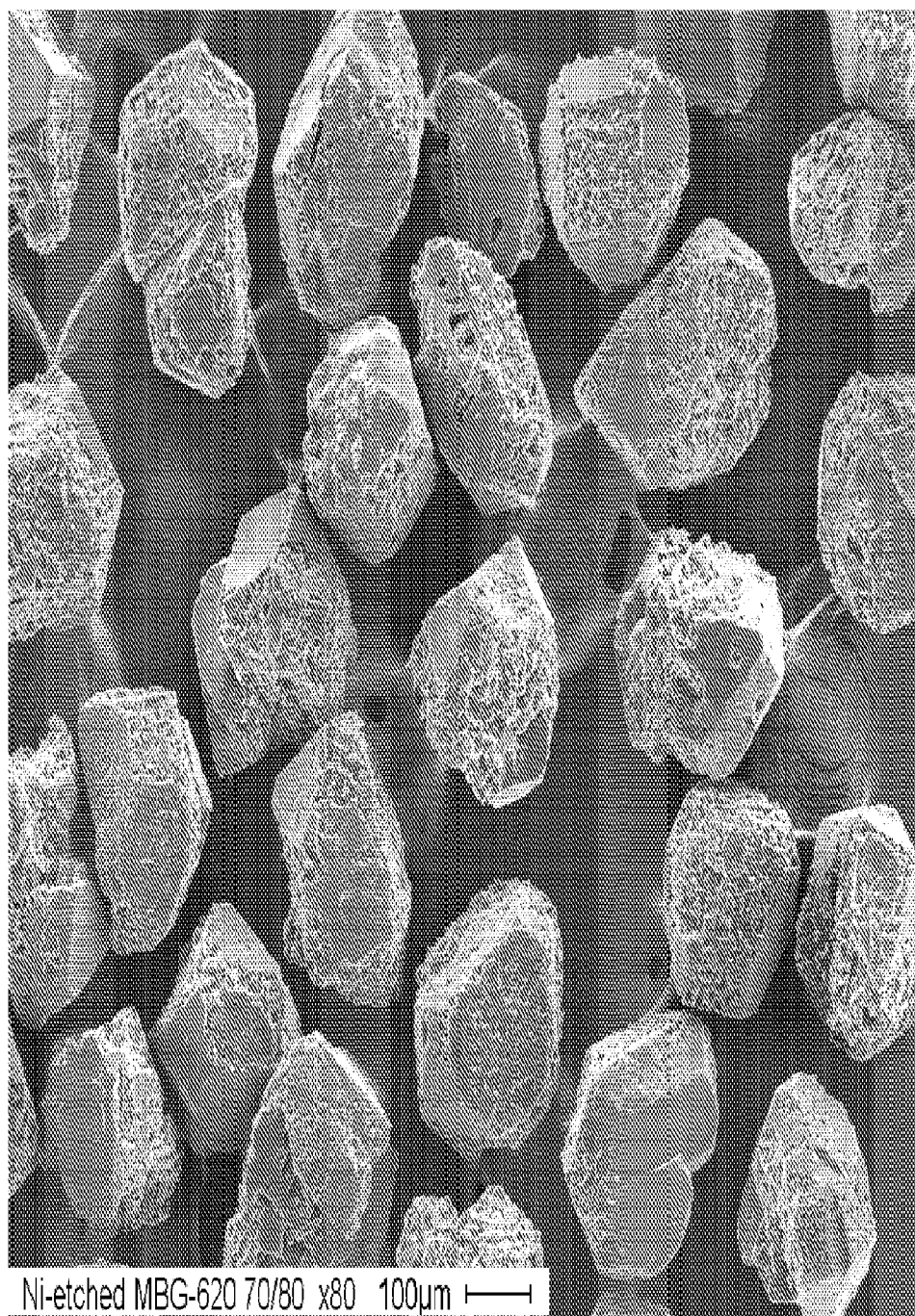


Fig. 27A

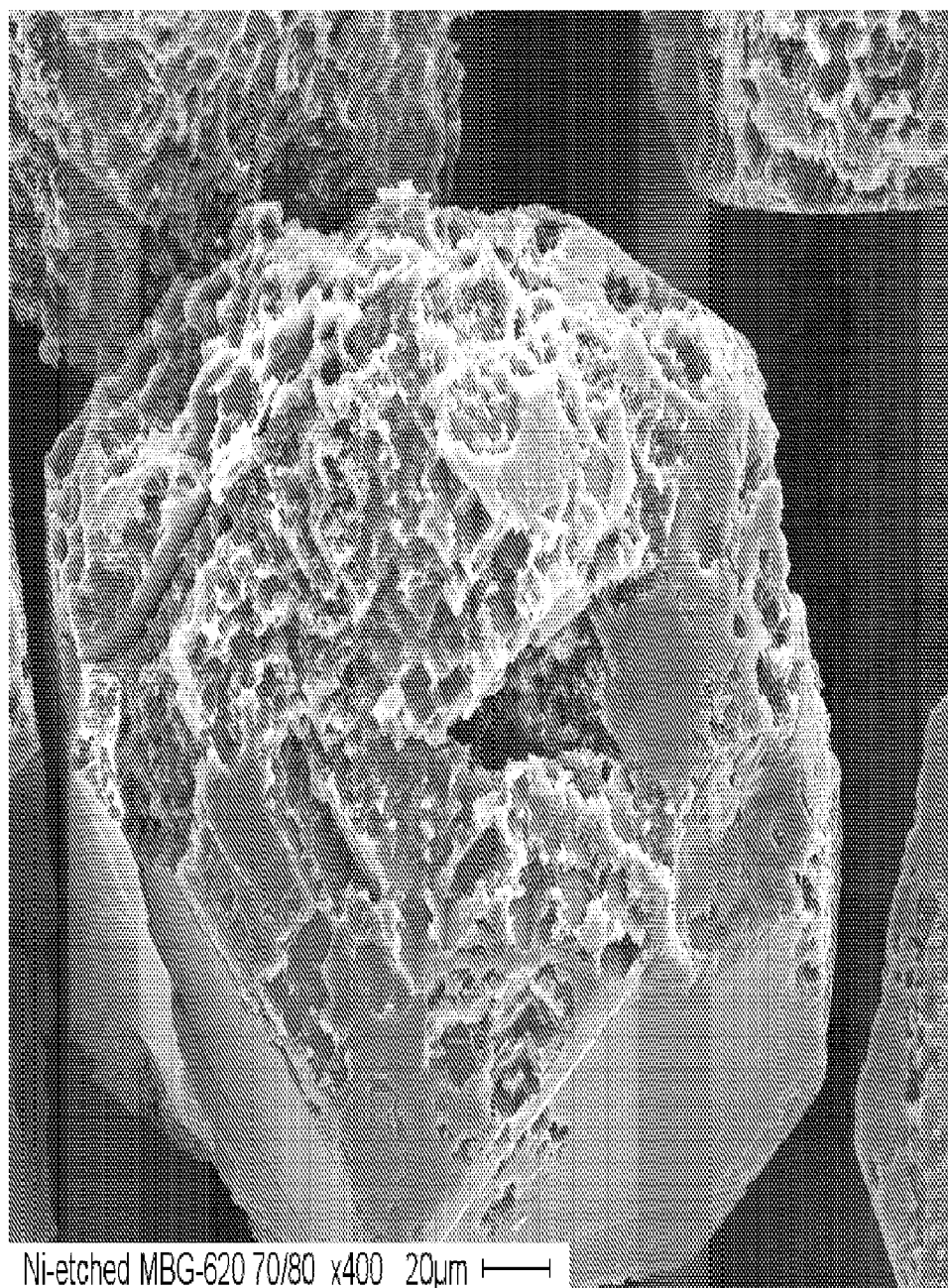


Fig. 27B