TABLE A-1. Patent documents related to production or enhancement of asterism in corundum.

Author(s)/applicant	U.S. patent documents/ publication year	Related patents (patent family)/publication year	Purpose	Technical details
J.N. Burdick and J.W. Glenn (Linde Air Products Company)	US 2,488,507 (1949)		Manufacture of asteriated ruby and sapphire	Growth of titanium-doped corundum and subsequent annealing of the synthetic boule at temperatures between 1500° and 1100°C to form precipitates of a titanium compound
J.N. Burdick and R.A. Jones (Union Carbide and Carbon Corporation)	US 2,690,062 (1954a)	DE 897 844 (1954b) DE 948 403 (1956) GB 697,804 (1953b) FR 1.029.418 (1953a) CH 289 320 (1953c)	Manufacture of asteriated ruby and sapphire with homogeneous color distribution and complete six-rayed stars	Increasing the homogeneity of titanium distribution within the Verneuil boule, crystal growth under fluctuating thermal conditions
W.G. Eversole and J.N. Burdick (Union Carbide and Carbon Corporation)	US 2,690,630 (1954c)	DE 922 584 (1955a) GB 712,735 (1954a) FR 1.067.037 (1954b) CH 307 914 (1955b)	Production of asterism in natural or synthetic corundum	Diffusion of titanium into a thin surface layer of a ruby or sapphire crystal at temperatures between 1950° and 1700°C and subsequent annealing of the corundum crystal at temperatures between 1500° and 1100°C to form precipitates of a titanium compound
G.A. Keig, J.C. Smith, and J.M.J. Watts (Union Carbide Corporation)	US 3,655,415 (1972) US 3,725,092 (1973a)	DE 2 208 150A (1973c) GB 1 377 428 (1974) FR 2.172.913 (1973d) CH 539 581 (1973b) AT 327 863 (1976)	Manufacture of asteriated ruby and sapphire with homogeneous color distribution and complete six-rayed stars in any desired size	Growth of titanium-doped corundum by the Czochralski technique and subsequent annealing of the synthetic crystal at temperatures between 1500° and 1100°C to form precipitates of a titanium compound
R.R. Carr and S.D. Nisevich (Union Carbide Corporation) R.R. Carr and S.D. Nisevich (Astrid Corporation, Ltd.) R.R. Carr and S.D. Nisevich (Astrid Corporation, Ltd.)	US 3,897,529 (1975a) US 3,950,596 (1976a) US 4,039,726 (1977)	DE 2 262 104A (1973c) GB 1 408 648 (1975b) FR 2.164.690 (1973a) CH 554 811 (1974) AT 330 722 (1976b) BE 793.007 (1973b)	Production of homogeneous color distribution or altering the appearance of color in asteriated and non-asteriated natural or synthetic corundum	Diffusion of titanium, diffusion of another transition metal, or diffusion of titanium together with another transition metal into a thin surface layer of a ruby or sapphire crystal at temperatures between 1850° and 1600°C; to produce asteriated corundum, subsequent annealing of the synthetic crystal at temperatures between 1500° and 1100°C to form precipitates of a titanium compound

US—United States; DE—Germany; GB—United Kingdom; FR—France; CH—Switzerland; AT—Austria; BE—Belgium