Mineral Industry Surveys

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FLUORSPAR IN THE THIRD QUARTER 2022

Fluorspar imports in the third quarter of 2022 were 170,000 metric tons (t), the highest import level in the past 5 years, 155,000 t of which were acid grade and 15,200 t of which were metallurgical grade (fig. 1, table 1). In terms of quantity, acid-grade imports increased by 24% compared with imports in the third quarter of 2021, and more than doubled compared with the second quarter of 2022. Imports of metallurgical-grade fluorspar decreased by 34% compared with that in the third quarter of 2021 and by 55% compared with the second quarter of 2022. The leading sources of acid-grade imports were, in descending order of quantity, Mexico (47%), Vietnam (27%), China (16%), and South Africa (10%). Mexico has been the leading source of domestic metallurgical-grade imports for decades, typically supplying more than 90% of domestic imports each quarter. In the third quarter of 2022, however, Mexico's share of metallurgical-grade imports was only 62%, followed by China (20%), and South Africa (18%) (table 2). Diversification of metallurgical-grade imports was likely a consequence of ongoing production constraints at Mexico's leading fluorspar mine.

In the third quarter of 2022, imports of other fluorine-containing materials produced directly from fluorspar were 27,800 t for hydrofluoric acid, 6,640 t for cryolite, and 5,120 t for aluminum fluoride (table 1). Mexico was the leading supplier of hydrofluoric acid accounting for 86% of imports (table 3). Exports of acid- and metallurgical-grade fluorspar, aluminum fluoride, and cryolite were likely re-exports as there is no domestic production (table 1).

In the third quarter of 2022, the quarterly average unit value of acid-grade imports was $416 per metric ton, an increase of 29% compared with the 2021 annual average unit value of $322 per metric ton. The quarterly average unit values of acid-grade imports from leading import sources were $566 per metric ton from China, $412 per metric ton from Vietnam, $379 per metric ton from Mexico, and $360 per metric ton from South Africa. The quarterly average unit value of metallurgical-grade imports in the third quarter of 2022 was $315 per metric ton, double the 2021 annual average unit

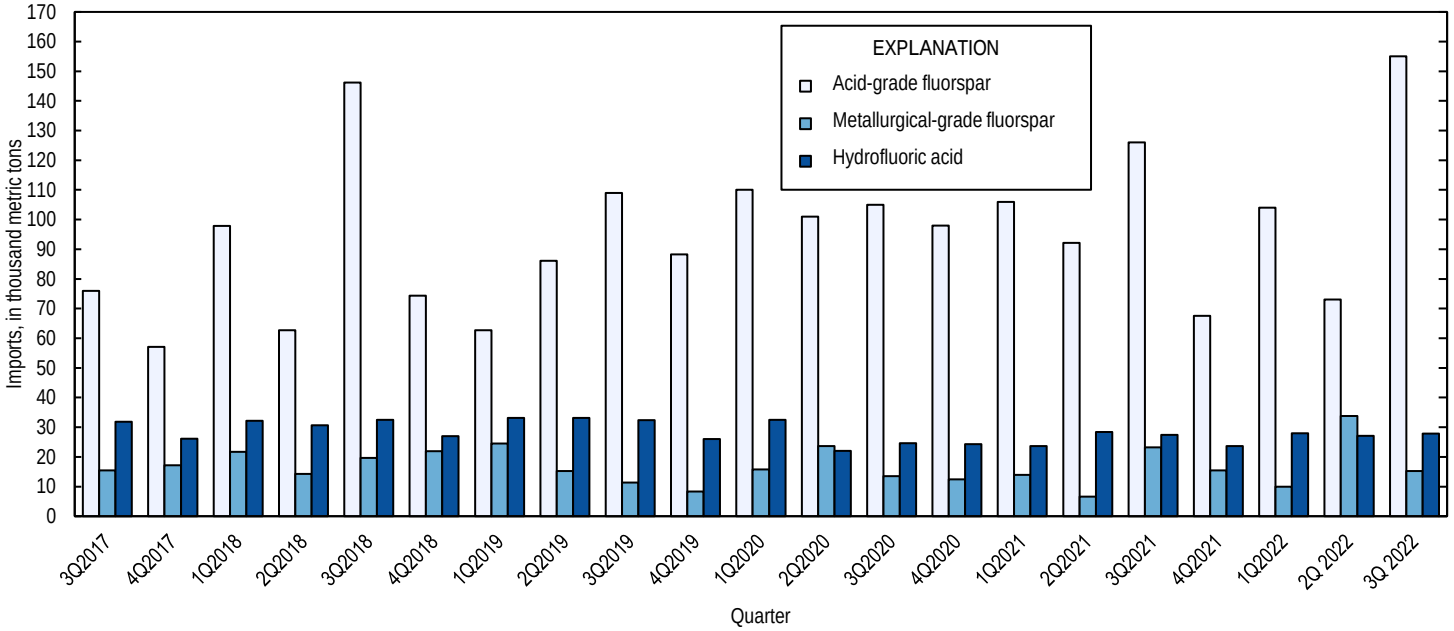

Figure 1. Acid-grade fluorspar, metallurgical-grade fluorspar, and hydrofluoric acid imports from the third quarter of 2017 through the third quarter of 2022. Source: U.S. Census Bureau and U.S. Geological Survey.

value. The quarterly average unit value of metallurgical-grade imports from Mexico, the leading import source, decreased by 18% to $116 per metric ton. However, that decrease was more than offset by increased imports from both China and South Africa; the quarterly average unit value from both of those countries was more than $600 per metric ton (table 2).

Legislation and Government Programs

In September, the United States became the 137th country to ratify the Kigali Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer. The goal of the amendment is to reduce production and consumption of hydrofluorocarbon (HFC) gases, commonly used as aerosols, refrigerants, and solvents, by 80% over the next 30 years, which is expected to reduce projected global warming by as much as 0.5 degree Celsius by the end of the century. The American Innovation and Manufacturing Act of 2020 essentially established all the HFC phasedown provisions and enforcement mechanisms needed to comply with the Kigali Amendment (Mufson, 2022; McRae, 2020, p. 26.1).

Mining and Exploration News

Ares Strategic Mining Inc. of Canada, which was developing a fluorspar mine in Utah, received a nearly $5 million loan from the U.S. Department of Agriculture's Business and Industry Guaranteed Loan Program. The company expected that the loan would be used to finish construction of a metallurgical-grade fluorspar processing plant, rail spur, and tailings dam (Ares Strategic Mining, Inc., 2022).

Fluorochemical News

The Chemours Co. announced that it would spend $80 million to expand production capacity of its low-global-warming potential hydrofluoroolefin 1234-yf (HFO-1234yf) refrigerant branded as Opteon™ YF in Ingleside, TX. Opteon™ YF is used in automotive, commercial, and residential air-conditioning, with as many as 80 million cars in the United States using HFO-1234yf. The company expected that debottlenecking projects combined with the expansion would increase plant capacity by approximately 40% (Chemours Co., The, 2022).

References Cited

Ares Strategic Mining, Inc., 2022, Ares Strategic Mining announces US$4,920,000 USDA financing approval: Vancouver, British Columbia, Canada, Ares Strategic Mining, Inc. press release, August 18. (Accessed January 6, 2023, at https://www.aresmining.com/post/ares-strategic-mining-announces-us-4-920-000-usda-financing-approval.)

Chemours Co., The, 2022, Chemours to expand Opteon™ capacity in Texas to meet growing customer needs for low GWP solutions: Willmington, DE, Chemours Co., The, press release, July 27. (Accessed January 6, 2023, at https://www.chemours.com/en/news-media-center/all-news/press-releases/2022/chemours-to-expand-opteon-capacity-in-texas-to-meet-growing-customer-needs-for-low-gwp-solutions.)

McRae, M.E., 2020, Fluorspar, *in* Metals and minerals: U.S. Geological Survey Minerals Yearbook 2016, v. I, p. 26.1. (Accessed January 6, 2023, at https://d9-wret.s3-us-west-2.amazonaws.com/assets/palladium/production/atoms/files/myb1-2016-fluor.pdf.)

Mufson, Steven, 2022, U.S. ratifies global treaty curbing climate super-pollutants: The Washington Post, September 21. (Accessed January 6, 2023, at https://www.washingtonpost.com/climate-solutions/2022/09/21/kigali-amendment-senate-super-pollutants-climate/.)

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TABLE 1
SALIENT FLUORSPAR STATISTICS[1]

(Metric tons)

	2021			2022		
	3d quarter	4th quarter	1st quarter–4th quarter	1st quarter	2d quarter	3d quarter
Production, fluorspar	--	--	--	--	--	--
Imports for consumption:[2]						
Fluorspar:						
Acid grade, more than 97% calcium fluoride	125,000	67,600	391,000	104,000	73,100	155,000
Metallurgical grade, less than 97% calcium fluoride	23,200	15,400	59,200	9,940	33,800	15,200
Total	149,000	83,000	451,000	114,000	107,000	170,000
Hydrofluoric acid	27,400	23,700	103,000	28,000	27,100	27,800
Aluminum fluoride	10,200	7,220	27,600	4,600	6,450	5,120
Cryolite	8,190	9,670	41,600	6,010	8,640	6,640
Exports:[2]						
Fluorspar:						
Acid grade, more than 97% calcium fluoride	754	1,070	3,860	2,250	5,650	3,800
Metallurgical grade, less than 97% calcium fluoride	2,570	2,380	10,900	2,420	2,920	2,050
Total	3,320	3,450	14,800	4,670	8,570	5,850
Hydrofluoric acid	3,470	2,480	16,600	2,310	2,000	2,530
Aluminum fluoride	65	28	196	560	9,800	937
Cryolite	2,710	4,360	10,700	2,980	2,560	4,230
Apparent consumption, fluorspar:[3]						
Acid grade, more than 97% calcium fluoride	125,000	66,500	388,000	102,000	67,500	151,000
Metallurgical grade, less than 97% calcium fluoride	20,600	13,100	48,300	7,520	30,900	13,200
Total	145,000	79,600	436,000	109,000	98,400	164,000

-- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Source: U.S. Census Bureau; may be adjusted by U.S. Geological Survey.

[3]Imports minus exports.

TABLE 2

U.S. IMPORTS FOR CONSUMPTION OF FLUORSPAR, BY COUNTRY AND VALUE[1, 2, 3]

	2021						2022					
	3d quarter		4th quarter		1st quarter–4th quarter		1st quarter		2d quarter		3d quarter	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Acid grade, more than 97% calcium fluoride:												
Canada	--	--	18,400	$5,350	39,400	$11,300	1	$3	--	--	11	$3
China	--	--	--	--	--	--	--	--	27,600	$16,300	24,600	13,900
Germany	82	$47	82	47	512	288	--	--	--	--	1	3
Hong Kong	--	--	--	--	--	--	134	71	--	--	142	88
Japan	636	370	824	446	2,380	1,380	629	361	3,580	580	249	131
Mexico	82,900	27,400	47,700	16,000	260,000	86,100	62,300	19,200	42,000	15,200	72,100	27,300
Mongolia	396	237	532	350	1,190	750	--	--	--	--	--	--
South Africa	--	--	--	--	24,800	9,940	18,200	6,090	--	--	16,000	5,770
Spain	7	5	--	--	7	5	--	--	--	--	43	42
United Kingdom	1	3	3	8	10	32	3	9	4	14	29	16
Vietnam	41,400	10,600 e	--	--	63,000	16,200 e	23,000	6,310 e	--	--	41,700	17,200 e
Total	125,000	38,600	67,600	22,200	391,000	126,000	104,000	32,100	73,100	32,100	155,000	64,400
Metallurgical grade, less than 97% calcium fluoride:												
Canada	--	--	6	4	6	4	--	--	--	--	8	5
China	15	12	300	169	455	263	270	150	1,500	878	3,020	1,870
Mexico	22,900	2,840	14,600	2,220	57,900	8,160	9,580	1,110	32,100	3,160	9,440	1,090
Mongolia	245	144	498	295	743	439	--	--	249	147	--	--
Netherlands	--	--	1	4	37	28	--	--	--	--	--	--
Pakistan	--	--	--	--	--	--	83	57	--	--	--	--
South Africa	--	--	--	--	29	15	--	--	--	--	2,730	1,820
United Kingdom	3	7	6	18	10	31	5	4	1	5	2	6
Total	23,200	3,000	15,400	2,710	59,200	8,940	9,940	1,320	33,800	4,190	15,200	4,790
Grand total	149,000	41,600	83,000	24,900	451,000	135,000	114,000	33,400	107,000	36,300	170,000	69,200

[e]Estimated. -- Zero.

[1]Imports for consumption include imports of immediate entry and warehouse withdrawals.

[2]Data are rounded to no more than three significant digits; may not add to totals shown.

[3]Cost, insurance, and freight at U.S. ports.

Source: U.S. Census Bureau; may be adjusted by U.S. Geological Survey.

TABLE 3

U.S. IMPORTS FOR CONSUMPTION OF HYDROFLUORIC ACID[1, 2]

	2021						2022					
	3d quarter		4th quarter		1st quarter–4th quarter		1st quarter		2d quarter		3d quarter	
	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)	Quantity (metric tons)	Value (thousands)
Canada	70	$153	90	$183	325	$679	121	$230	104	$220	86	$184
China	18	20	17	48	329	464	56	96	--	--	165	273
Germany	136	276	250	619	884	1,810	111	282	238	590	14	22
India	89	151	53	93	430	656	--	--	18	40	79	231
Japan	662	1,440	536	1,190	2,280	5,040	393	854	724	1,460	524	1,300
Korea, Republic of	308	1,010	293	953	1,020	3,190	200	614	552	966	898	1,450
Mexico	25,300	40,900	21,300	35,500	93,800	150,000	26,100	47,900	24,100	45,000	24,100	50,000
Mongolia	--	--	--	--	17	39	--	--	--	--	--	--
Singapore	113	398	97	365	417	1,430	80	295	118	456	128	516
Spain	389	541	510	795	1,830	2,660	331	649	386	976	724	1,780
Taiwan	365	795	559	1,260	1,940	4,870	610	2,100	860	2,780	934	2,720
United Kingdom	(3)	3	--	--	(3)	3	--	--	--	--	229	313
Total	27,400	45,700	23,700	41,000	103,000	171,000	28,000	53,100	27,100	52,500	27,800	58,800

-- Zero.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Cost, insurance, and freight at U.S. ports.

[3]Less than ½ unit.

Source: U.S. Census Bureau.