

CHEMICAL-MINERALOGICAL CHARACTERISTICS OF CERAMIC RAW MATERIALS FROM THE CORUMBATAÍ FORMATION (CERAMIC POLE OF SANTA GERTRUDES, SP, BRAZIL)

**⁽¹⁾ C. Del Roveri, ⁽¹⁾ A. Zanardo,
⁽¹⁾ M. M. Torres Moreno, ⁽²⁾ E. García Romero**

⁽¹⁾ Universidade Estadual Paulista "Júlio de Mesquita Filho"/
Departamento de Petrologia e Metalogenia, Brazil

⁽²⁾ Universidad Complutense de Madrid/

Departamento de Cristalografía y Mineralogía, Spain

cdroveri@rc.unesp.br; azanardo@rc.unesp.br; mmoreno@rc.unesp.br;

mromero@geo.ucm.esrc.unesp.br; mromero@geo.ucm.es

The ceramic pole of Santa Gertrudes, located 140 kilometres from the city of Sao Paulo, the south-eastern region of Brazil, uses only Corumbataí Formation raw materials that have been dry ground using hammer mills and pendular mills to manufacture ceramic tiles.

This unit consists essentially of red-coloured rocks, such as lutite and illite limonite intercalated with feldspathic limonite and, secondarily, quartz or carbonate veins.

The basal strata are normally grey or greenish grey. Many of the quarries are located at the base of the Formation, where the material is more illitic and is practically free of carbonates. There are also quarries located in the central part of the column, and in the ceiling, where the average carbonate content is approximately 10% of the volume.

It is important to point out that only industries that improve the milling system are able to use the material from the ceiling of the formation in their tile manufacturing processes, because of the hardness of the lumps of carbonate material.

Fourteen samples, including all the types of raw materials existing in the unit were studied by chemical analysis by X-Ray Fluorescence (table 1), X-Ray Diffraction, and Optical and Scanning Electron Microscopy (figure 1).

The results showed that the minerals from the base and from the ceiling of the unit have different chemical-mineralogical characteristics, which directly influence their technological properties. These characteristics are influenced by a variety of factors such as regional tectonics, superficial alteration of the rocks, hydrothermal fluids and size of the mineral grain.

This information can be used appropriately to focus the use and mixture of raw materials, with a view to improving product quality and variety from the Production Pole.

Sample	SiO ₂	TiO ₂	Al ₂ O ₃	Fe ₂ O ₃	MnO	MgO	CaO	Na ₂ O	K ₂ O	P ₂ O ₅	L.O.I.*	Total
CDR-1	66.68	0.52	12.16	3.14	0.08	2.12	2.94	3.42	2.30	0.11	6.54	100.02
CDR-2	70.21	0.67	13.91	4.82	0.08	1.60	0.40	2.54	3.25	0.11	2.42	100.00
CDR-3	82.93	0.38	8.72	0.80	0.07	0.44	0.74	2.78	1.72	0.14	1.29	100.00
CDR-4	71.88	0.53	10.43	4.52	0.07	1.57	2.41	2.19	2.85	1.31	2.23	100.01
CDR-5	71.38	0.58	11.77	5.11	0.05	2.36	1.10	2.04	2.92	0.47	2.23	100.02
CDR-6	72.64	0.68	14.31	3.20	0.02	1.39	0.33	3.25	2.13	0.10	1.92	99.99
CDR-7	66.73	0.52	11.57	5.74	0.05	2.60	2.66	2.92	2.76	0.22	4.24	100.01
CDR-8	59.52	0.66	13.13	6.19	0.10	3.30	3.53	3.60	2.88	0.15	6.92	99.99

CDR-9	22.65	0.19	5.02	1.37	0.21	1.04	38.45	1.92	0.69	0.07	28.42	100.06
CDR-10	66.16	0.67	14.00	5.32	0.14	2.38	1.21	2.49	3.85	0.11	3.67	99.99
CDR-11	66.59	0.49	14.78	6.43	0.02	2.13	0.42	2.32	2.30	0.09	4.39	99.99
CDR-12	61.71	0.39	9.54	2.88	0.07	4.21	6.01	1.74	1.90	0.14	11.41	99.99
CDR-13	71.13	0.62	13.40	3.26	0.03	2.23	0.69	3.61	3.23	0.21	1.59	100.00
CDR-14	44.20	0.62	14.29	3.50	0.12	6.00	12.42	0.96	0.94	0.18	16.77	100.00

*L.O.I. = Loss on Ignition

Table 1. Chemical analysis of the samples.

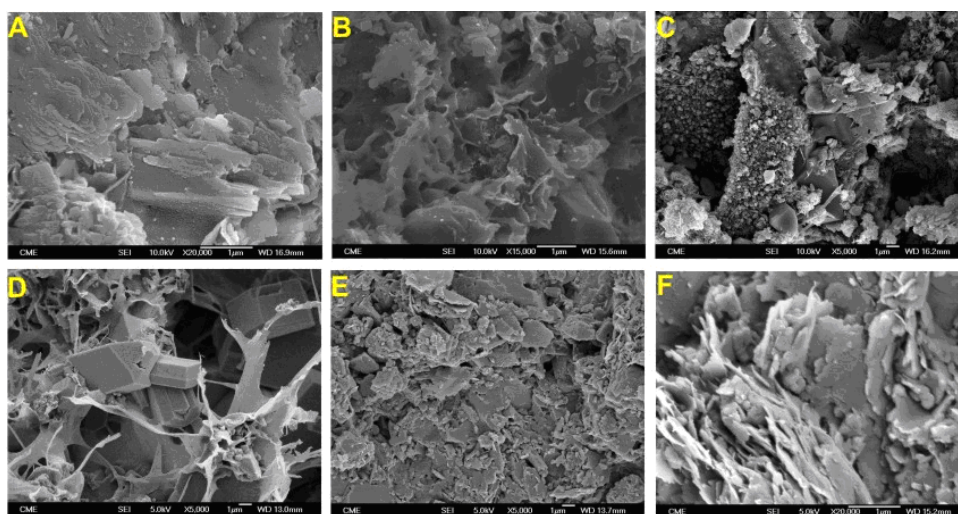


Figure 1. Examples of images obtained from samples: (A) CDR10, region rich in illite; (B) CDR1, possibly smectite; (C) CDR12, grains coated with clays and hematite; (D) CDR7, feldspar crystals and fibres, which could be illite or palygorskite; (E) CDR8, illite coated with hematite and analcime; (F) CDR9, illite and smectite.

ACKNOWLEDGEMENTS

The authors thank FAPESP, CAPES and CNPQ for the grants and scientific projects.

REFERENCES

- [1] BARBA, A., FELIU, C., GARCIA, J., GINÉS, F., SÁNCHEZ, E., SANZ, V. 1997. Materias primas para la fabricación de Soportes de Baldosas Cerámicas. ITC-AICE, 1ª Edição, 1997, 292p.
- [2] INSTITUTO DE PESQUISAS TECNOLÓGICAS DO ESTADO DE SÃO PAULO - IPT. Bases técnicas para o desenvolvimento da indústria mineral do pólo cerâmico de Santa Gertrudes – SP. IPT/SCTDET (Rel. IPT 64.402). 92 p. 2002.