ISLAMIC GLAZED POTTERY FROM FUSTAT (?) COMPOSITION AND TECHNOLOGY

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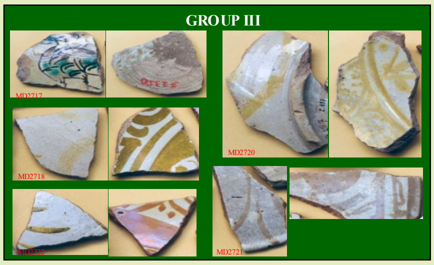
This study centred on the analysis of ten pottery sherds from the collections of the Islamic Museum in Berlin (this analysis was made possible courtesy of Gisela Helmecke and Dr Volkmar Enderlein). Two of the analysed fragments were undoubtedly wasters arising from a fault in the technological process used in creating them - supporting pins survive stuck to the sherds. Based on macroscopic criteria and on the provenance of these fragments, it is possible to infer that they were produced at workshops in Fustat. Any certainty as to the provenance of the material in question can, however, only be attained by comparing the results of laboratory analysis for these fragments with the analysis results for kiln pottery recovered from occupation levels at the Fustat site. At this stage of research the attribution of the ten analyzed fragments is actually based mainly on comparisons with kiln pottery from other production centres (e.g. Raqqa) and on a comparison of the geochemical parameters of modern pottery produced nowadays in the Nile Delta.

GROUP I

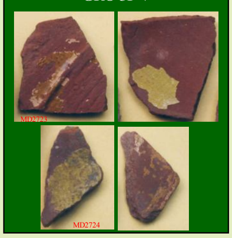
GROUP II

GROUP IV

GROUP III



GROUP V

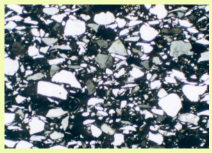


METHODS

- MGR-analysis
- Chemical analysis by WD-XRF
- Thin-section study

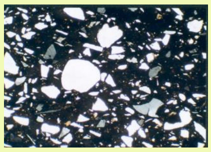
Group I

This group is represented by a vessel (MD2715) made from a quartz body (i.e. a ceramic body containing over 80% SiO_2). Chemical analysis shows that the body comprises nearly 87% SiO_2. Silica occurs in the form of quartz grains which are rounded to various degrees; grain size ranges from 0.012-0.25mm, up to a maximum of *c* 0.4 mm (one elongated grain measuring 0.5mm). The matrix of this sample is almost isotropic, and other than quartz grains very fine opaque minerals can also be seen in it. In comparison with quartz ceramics from the kiln site in Raqqa this sample is distinctive in having twice as great a content of aluminium (Al). In addition, it is characterised by a very low content of magnesium (Mg), a low content of calcium (Ca), a very low content of nickel (Ni) and a content of zirconium (Zr) which is fairly high for quartz ceramics. This indicates that, in comparison with pottery from the production sites at Raqqa, the ceramic body of the analysed fragment contains a relatively large amount of clay minerals (twice as many as Raqqa Ware). The fragment under consideration was a waster produced as a result of using an excessively high firing temperature. The pin on which this vessel stood in the kiln was stuck to the glaze, as was the pin placed inside the vessel to support the pot placed above it.



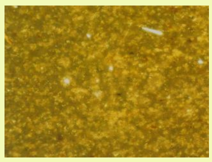
Group II

A further example of a waster produced by too high a firing temperature is represented by sample MD2516, which belongs to group II. This sample has a melted matrix type and was made using a ceramic body consisting of a high-calcareous matrix and a large quantity of variously rounded grains of quartz (a greater number of rounded grains were noted than in sample MD2715), Grain sizes range from 0.012-0.4mm, up to a maximum of 0.65 mm. Fewer quartz grains were, however, noted than in the sample made from a quartz body (Fig.2). The $Si0_2$ content amounts to 72%, the larger proportion of matrix is reflected in a greater content of Al and Ca. The silica content is very high for pottery made from a clay-body, though not high enough to be classified as a quartz-body. Is this perhaps an example of a hybrid somewhere between a clay-body and a quartz-body? The ceramic body from which this sherd was made has preliminarily been defined as a quasi-quartz-body.



Group IV

Sample MD2719, which was produced, like the pottery belonging to group III, using a high-calcareous body, although the phase composition and chemical composition of this sherd are markedly different from that of the group III fragments. The group IV sample has a sintered matrix type, and seen in thin-section the homogeneous matrix contains only individual grains of quartz and some grains of weathered plagioclase, the size of grains measuring 0.02-0.5mm. One fine grained rock fragment (biotite+quartz) measuring 0.2mm was also noted. In comparison with group II the Mg content is twice as high, and the content of the geochemically significant elements Cr and Ni is also much greater.

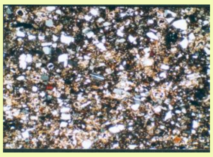


RESULTS

Taking into consideration the results of analysis carried out in Berkeley (*Michel 1976*), as well as the results of analysis conducted by the authors of this article on raw materials and contemporary local pottery from Cairo and Darmanhur, as well as the geological context of the Fustat workshops, it is possible to state that the ceramic fragments from groups I, II, III and V were produced locally at Fustat's potteries. One example illustrating this point comes from the results of chemical analysis for group V samples, which are almost identical to the results obtained for contemporary local pottery products currently sold in Cairo. In contrast, at this stage of research, the fragment belonging to group IV appears to be from a sherd made at another production centre (chemical analysis results indicate that this could not have been the production centre at Raqqa, could have been the workshop at Samarra).

Group III

The pottery (MD2717, MD2718, MD2720, MD2721 and MD2722) in this group was made using a high-calcareous body of semi-melted matrix type. Quartz grains predominate in the non-plastic material, with hornblende and some plagioclase being noted. Grain sizes vary from 0.015-0.2mm, up to a maximum of 0.3mm. Empty pores fringed by cryptocrystalline carbonates were also observed, as was one grain representing the remains of a volcanic rock fragment.



GROUP I	GROUP II	GROUP III	GROUP IV	GROUP V
slightly over-melted matrix type	over-melted matrix type	semi over-melted matrix type	sintered matrix type	melted matrix type

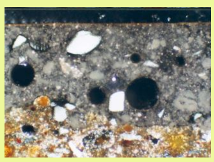
MGR - analysis

TRANSPARENT GLAZE

Group I-II

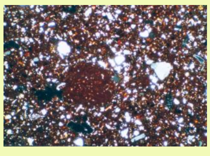
OPAQUE GLAZE

Group III-V



Group V

The two fragments (MD2723 and MD2724) of red-fired pottery comprising this group were made using high-iron-rich non-calcareous bodies. The Fe content is *c.* 12%, which means that they have a melted matrix type despite a Ca content of *c.* 5%. Thin-section analysis reveals the presence of grains of quartz, hornblende, opaque minerals, plagioclase, some mica and clay aggregates; grain sizes of 0.012-0.2mm (maximum size for quartz 0.25mm and clay aggregates up to *c.* 0.75mm).



CHEMICAL ANALYSIS by WD-XRF

Sample No.	SiO_2 % by weight	TiO_2	Al_2O_3	Fe_2O_3	MnO	MgO	CaO	Na_2O	K_2O	V ppm	Cr	Ni	Zn	Rb	Sr	Y	Zr	Ba
Group I																		
MD2715	**86.65**	0.47	5.84	1.10	0.051	0.41	1.41	2.96	1.04	38	55	15	10	14	161	13	96	70
Group II																		
MD2716	**71.86**	0.58	7.48	3.81	0.047	1.94	**10.56**	2.33	1.14	79	65	25	38	12	509	18	162	149
Group III																		
MD2717	53.57	0.92	11.54	5.98	0.077	3.53	21.33	1.46	1.26	119	99	**33**	87	22	794	27	301	283
MD2718	55.50	1.04	12.62	6.73	0.082	3.47	17.39	1.49	1.30	124	110	**37**	74	29	704	25	298	312
MD2720	52.52	0.98	12.70	6.70	0.090	3.61	20.23	1.47	1.31	129	119	**38**	91	30	734	25	287	278
MD2721	53.38	0.94	11.65	6.14	0.079	3.48	20.93	1.42	1.67	112	98	**37**	79	34	746	24	299	300
MD2722	54.27	0.95	11.61	6.13	0.082	3.36	20.33	1.42	1.52	120	99	**34**	82	37	803	26	322	281
Group IV																		
MD2719	49.36	0.70	12.41	6.64	0.115	**7.97**	20.10	1.73	0.79	**137**	**227**	**162**	381	36	367	20	120	201
Group V																		
MD2723	57.92	2.14	7.01	**11.22**	0.173	3.42	**4.68**	1.59	1.50	225	176	82	109	52	279	bd	290	416
MD2724	55.41	2.37	17.24	**12.07**	0.204	3.68	**5.16**	1.80	1.56	250	181	94	125	44	316	28	266	414

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