

Data Ion Chromatography Analysis

Object / Record : 911 (KN&V)

Artist : Anoniem

Title and date : Kelkglas, vrijgeblazen, vormgeblazen, 1600-1700

Conservator : Mandy Slager



General condition

Date: 16/09/2020

2013: Slecht, lacune knop stam, dof uiterlijk, weeping, incipient crizzling, zouten op de standvoet
 2013: object mag gereinigd worden maar in beperkte mate, no details mentioned if cleaned and if so how. 2017: light crizzling in cuppa
 2020: 17 sept: samples taken en IC analysis: conditie matig tot slecht. Dof en matting, weeping en vochtig. Crizzling in bol stam. glimmertjes en barsjes, Cirkel van monstername blijft duidelijk zichtbaar na afloop. Red = very poor
 2023: c.2 slippery inside cuppa and slightly top side foot, d.2 incipient crizzling cuppa d.2.3 or d.2.4 crizzling

Very poor

Examination and analysis

Date: 01/08/2023

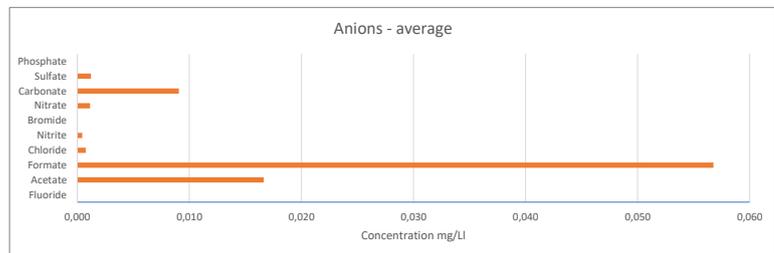
Analysis June 2017: samples were very likely taken from the exterior side of the object (cuppa) by G. Verhaar. The results show relatively high (extremely high) alkali concentrations.
 Analysis september 2020: samples were taken from the exterior surface of the object for analysis by means of Ion Chromatography by G. Verhaar, M. Slager and UvA. The results show relatively high (extremely high) alkali concentrations.
 There has been an increase in Sodium (and potassium) concentrations from 2017 tot 2020. Actually a large increase.

Likely unstable

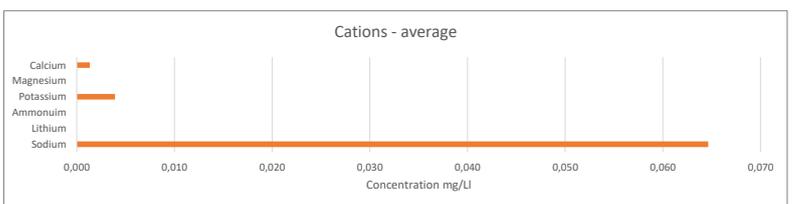
Concentrations (mg/L)

	Anions			
	U	Ave	SD	RSD
Fluoride	19,00	0,000	0,000	0,000
Acetate	60,05	16,639	7,865	0,473
Formate	45,02	56,768	19,933	0,351
Chloride	35,45	0,748	0,258	0,345
Nitrite	46,01	0,439	0,184	0,419
Bromide	111,96	0,025	0,042	1,732
Nitrate	62,01	1,144	0,400	0,349
Carbonate	60,01	9,062	5,194	0,573
Sulfate	96,06	1,225	0,432	0,353
Phosphate	94,97	0,000	0,000	0,000

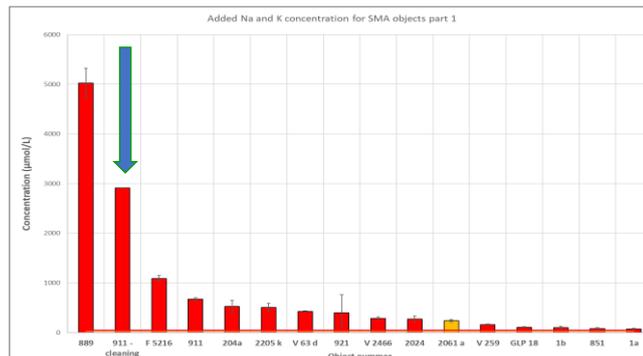
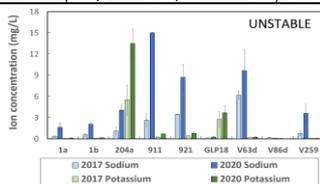
Graphs and/or Tables



	Cations			
	U	Ave	SD	RSD
Sodium	22,99	64,653	22,659	0,350
Lithium	6,94	0,000	0,000	0,000
Ammonium	18,04	0,000	0,000	0,000
Potassium	39,10	3,916	1,454	0,371
Magnesium	24,31	0,000	0,000	0,000
Calcium	40,08	1,336	0,607	0,454



Added Na and K concentrations			
Sodium	22,99	2812,251	
Potassium	39,10	100,158	
Total	µmol/L	2912,409	Likely unstable



Categorisation total alkali ion concentration		µmol/L
IC-A	Likely stable	< 20
IC-B	potentially unstable	>20 <50
IC-C	likely unstable	> 50

Interpretation, questions and comments on results

The object was cleaned in 2013 (unclear how and with what). Images were taken by the Visual Art Box in 2013 and show the object in a very cloudy state with crizzled knob before cleaning. After cleaning the crizzling in the cuppa and knob can still be clearly seen. Also crizzling in the foot is apparent on the images. The cloudyness seems to be very much related to the dust and dirt that is collected on the surface (especially on the foot), perhaps due to the slipperiness of the surface. The condition of the glass seems to be unchanged since. It is possible that extra crizzling has developed. Perhaps that is difficult to determine from the images. In 2023 the cuppa and foot have a slippery surface (again?). In relation to the theory of microclimate inducing or promoting degradation: for the cuppa that may be true, but the slippery top side of the foot proves otherwise.

The results from the IC analysis show relatively high (extremely high, highest of objects in Boijmans IC category) concentrations Sodium, Formate, Chloride, Calcium and also a bit of Sulfate. Also a small peak for potassium. The combination of sodium and potassium is often the case in unstable glass. The concentration of sodium is dominant compared to potassium (one species being dominant is usually the case when both are present in unstable glass. Also high peaks for carbonate and acetate. Although carbonates are often found on unstable glass as well, the method of IC analysis is not very sensitive for carbonates (therefore high default margin). The high concentration of Sodium etc. is in line with the characteristics noticed during examination: slippery and crizzling.

In the two top graphs with representation of average concentrations of anions and cations, the standard deviation can be drawn from the raw data in the left tables, but is not inserted in the graphs. They are included in the last graph. In the bottom graph the LOQ line and red line indicate that this object falls within the IC-A category. The red colour of the bar indicates that the condition was assessed as being very poor during visual examination prior to sample taking. It shows that the signs visually noticed were in line with the IC results. Also sulfate is detected, the source for this is unknown (further research needed).

Suggestions further examination or analysis

- * More information about the manufacturing process.
- * Compositional analysis (XRF or other) to be able to combine data from visual examination with IC data and composition information for even deeper understanding of condition.
- * Fractography * Further IC analysis of different areas within object * Research into the source for the sulfates detected