The Leverhulme Network of
the Composition of Byzantine
Glass Mosaic Tesserae

Glossary of Mosaic Glass Terms

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Glossary of Mosaic Glass Terms

English/Italian/French	Explanation
Alkali *Alkali* *Alcalins*	See *Fluxes*
Alumina, Aluminium oxide *Allumina* *Alumine*	Alumina or Aluminium oxide, Al_2O_3. Found in varying quantities in *silica* sands or natural *fluxes* (such as *natron* or ashes), alumina was unintentionally added to glass with the raw materials, and also came from the slow dissolution of the melting pots of which it could be a main constituent. In the glass network alumina behaves as a *glass former* and in small quantities it considerably improves the chemical resistance and durability of glass.
Anima (pl. *Anime*)	Anima (literally 'soul') is a term used on the Venetian island of Murano, known for its long history of glass manufacture, for a semi-finished crystalline product used as opaque pigment in glass slabs. The opacity and colouring of various shades, from yellow to orange through to brown are caused by crystals of lead antimonate or stannate, which have been prepared separately. Cooled and reduced to a powder, the anime are added to molten, transparent, colourless or coloured glass and quickly incorporated through energetic stirring. The glass must then be worked immediately to prevent the crystals from dissolving. Anime were used also to modify the shades of coloured glass *tesserae* (green, brown, blue etc. See *colour*).

English/Italian/French	Explanation
Annealing *Ricottura* *Recuisson*	A slow cooling process starting at c. 500°C in a special oven. The newly moulded glass (or glass slab) is annealed to prevent stress due to the different cooling times of the surface and the mass of the object, which causes different contractions in volume. In the post-medieval process, the annealing oven was situated in the upper section of the melting furnace and made use of the combustion fumes to re-heat the glass. No complete Byzantine furnaces have been excavated so it is not known if they had an annealing chamber, but the discovery of glass vessels buried in ash in a workshop (in Beth She'an (Israel, ancient Scythopolis)) has led to suggestions that annealing was carried out separately from the melting furnace. A small rectangular tank used for annealing and placed next to the firing-chamber has been found in Lyon and dates from the first century AD. Nowadays the annealing oven (also called the Lehr or tempering oven) is separate from the melting furnace and may be an independent refractory chamber re-heated to 500°C or be a part of a continuous tunnel structure.
Batch *Miscela vetrificabile* *Mélange vitrifiable*	The mixture of minerals, which, when fused together at high temperatures, provides the material for glass. The batch contains: minerals (*silica* sands SiO_2), which form the glass network; *fluxes* (*soda* Na_2CO_3 or potash K_2CO_3) to lower the melting point; and *stabilisers* (carbonates of calcium $CaCO_3$ and magnesium $MgCO_3$ or lead oxides PbO) included to enhance the durability of the product; broken waste glass (*cullet*); colorants; and *opacifiers* as required.
Blow pipe *Canna da soffio* *Canne à souffler*	A hollow metal tube (which could also be made of other materials such as glass itself), used to remove a gather of fused glass from the pot. Once removed from the furnace, the glass is shaped by blowing it into a hollow sphere and then with the aid of various other instruments into the form or object desired. The blow pipe is usually thickest at the end used to pick up the glass and is heated before being plunged into the fused glass to make the glass adhere better. This method concerns only production of *cartelline* in glass mosaic production.

English/Italian/French	Explanation
Cake	See *slab.*
Calcine	The heating (of a substance) to a high temperature, but below the melting or fusing point, causing loss of moisture, reduction or oxidation, and the decomposition of carbonates and other compounds.
Calcined lead and tin *Calce (o calcina) di piombo e stagno* *Plomb et étain calcinés*	A white powder obtained by heating lead and tin together. Calcined lead and tin was used in making white opaque glass or as an *opacifier* in coloured glass. The opacifying effect was caused by the formation of crystals of stannic oxide (cassiterite SnO_2). For yellow glass, calcined tin and lead were first reacted with *silica* to form *anima*. This provided crystals of yellow lead stannate.
Calcium oxide (Ca0) *Ossido di Calcio* *Oxyde de Calcium*	The main stabilising component in glass compositions. In the Byzantine period it seems likely that it was introduced incidentally as a component of sand or raw materials. Today it is introduced into the batch by adding limestone (calcium carbonate $CaCO_3$), marble or dolomite (calcium and magnesium carbonate $MgCO_3$)
Cartellina (pl. *Cartelline*)	Cartellina is a thin layer of blown glass covering the *metal leaf* in gold and silver *tesserae*. The cartellina can be as thin as 0.2mm to 1mm, but occasionally as thick as 10mm. The cartellina is applied by firing and protects the *metal leaf* from oxidation as well as giving a shining tint to the *tessera*. If the cartellina comes loose, a common phenomenon in Byzantine *mosaics*, it leads to the loss of the *metal leaf* and the *tessera* is discoloured (see also *Weathering*).
Cassa	The Venetian name for a long-handled iron spoon used to collect the gather of glass to be poured onto the flat mould to make thin *slabs*.

English/Italian/French	Explanation
Colour (transparent glass) *Colore (vetro trasparente)* *Couleur (verre transparent)*	Transparent glass is coloured by metal elements (ions), which absorb parts of visible radiation. Some colorants are found naturally in the principal raw materials (iron, carbonaceous residues etc.). Added in this way to the *batch*, they naturally colour glass in shades of blue to green and yellow. These unintentional colours may be reduced by adding manganese (Mn), antimony (Sb) or other oxidizing agents that can produce decolourised glass. The deliberately-added colouring agents in Byzantine glass making were copper (which in its oxidised state, CuO, gave green (with iron) and blue-green colours, but could give an opaque red under strongly reducing conditions Cu_2O); manganese (purple); and cobalt (Co) (blue). Gold (Au) (used widely only since the seventeenth century) produces a ruby red glass (known as gold ruby) and gold-silver alloys appear to have been used in some Late Roman/Byzantine glasses to produce reds and pinks (eg. the Lycurgus Cup). In modern glasses, brown, gray and black colours are obtained by adding several colourants, but in the Roman and Byzantine world these colours were made by adding excess iron (Fe) or manganese. Other ionic colouring agents such as chrome (Cr), selenium (Se), cadmium (Cd) and some rare earth metals have been used since the nineteenth century.
Colour (opaque glass) *Colore (vetro opaco)* *Couleur (verre opaque)*	Opaque glass can be coloured by finely-dispersed crystals (pigments. See also *Anima*). Coloured crystals can separate out from the fused glass during slow cooling or can be prepared separately and added to the molten glass. In the Roman period white glass (see also *corpo*) was made using calcium antimonate crystals. From the fourth century AD and in Byzantium calcined lead and tin (tin oxide, cassiterite) were used. Lead arsenate and calcium phosphate (bone ash) were used in glass enamels from at least the thirteenth century, while lead arsenate was used from the late sixteenth century. White pigments added to an ionic compound coloured glass could be used to produce, for example, opaque blue (when added to a cobalt-coloured glass) or turquoise (when added to a copper-containing glass) in up to five or six shades). When added to a ruby transparent glass, a carnation colour is obtained, and there are a few possible examples of this practice in late Roman glass opus sectile from the eastern Mediterranean region (Egypt and Greece). Opaque red was made using copper in the reduced state resulting in two shades of opaque red glass commonly called ‘sealing wax red’ (large cuprite

English/Italian/French	Explanation
	dendritic crystals) and 'brown red' (metallic copper micro-spheres and cuprite crystals). Yellow or yellow orange glass was produced using lead stannate or antimonate crystals. When added to a green glass yellow pigments can make several yellow-green shades. Orange glass, sometimes called 'becco di merlo', was coloured by the crystallisation of small cuprite crystals from a high lead glass. Fragments of fired clay or black particles were added to obtain certain shades of brown or green etc..
Corpo	This Murano term (literally meaning 'body') is still used to describe the semi-finished crystalline material that is added to transparent glass in order to make it white or opaque.
Corrosion *Corrosione* *Corrosion*	See *Weathering.*
Cullet *Rottame di vetro* *Calcin ou Groisil*	Scraps of glass broken during production or collected on the ground (see *re-cycling*) to be melted again to produce new glass items. Glass can be re-melted infinite times without losing its properties.
Cutting *Taglio* *Taille*	The ancient method used to divide glass with a hammer (*martellina*) and chisel into small pieces (*tesserae*) from glass slabs or from larger *tesserae*. The glass slab is placed on the blade of the chisel and by delivering a sharp blow with the hammer a clean cut with no splintering is made. The same technique may be used by mosaicists to break up the *tesserae* further, as required. To facilitate cutting, the surface may be scored beforehand with a diamond tool (or a tool of a material harder than glass). Because it is more brilliant, the cut edge is placed facing outwards in the mosaic (except in the case of metal leaf tesserae). Today automatic or semi-automatic machines are used for cutting.
Decay *Alterazione* *Altération*	See *Weathering.*

English/Italian/French	Explanation
Decolourisers *Decoloranti* *Décolorants*	Decolourising agents are used to eliminate or reduce the natural green, yellow and blue colourisation, which happens as a result of the colouring effects of impurities (iron, carbonaceous particles, etc.) in the raw materials. A decolourising agent does not remove the *colour*, but neutralises it. Decolourised glass is thus more or less grey, depending on the amount of decolouriser. In the Byzantine world, the standard decolouriser appears to have been the oxidising agent pyrolusite (manganese oxide, MnO_2), but antimony oxide (Sb_2O_3) was used in some earlier Roman glass.
Devitrification *Devetrificazione* *Dévitrification*	The process whereby micro crystals separate during the slow cooling of *molten glass*. It is increased by the presence of a number of elements such as arsenic, antimony and phosphorous and is used in the production of translucent or opaque glass. In glass blowing, devitrification can be a disadvantage as it makes the *molten glass* less plastic. The term is sometimes mistakenly employed to describe the *weathering* of glass.
Durability *Resistenza chimica* *Durabilité*	The capacity of glass to resist attack (See also *Weathering*) from atmospheric agents (especially humidity) without decaying (chemical resistance). Durability depends on the composition of the glass, especially the quantity of *silica*, *stabilisers* (enhances durability) and *fluxes* (weaken durability) and on the environmental parameters. The conservation environment is of crucial importance: in conditions of low humidity and constant environmental parameters even low durability glasses can be conserved without undergoing any noticeable decay.

English/Italian/French	Explanation
Fluxes *Fondenti* *Fondants*	When added to *silica* (See *Glass former*), various quantities (from 10-30% of the total weight) of fluxes lower the melting temperature. The most common fluxes are sodium carbonate (*soda* Na_2CO_3) and potassium carbonate (potash K_2CO_3). After decomposing upon heating, they react with the *silica*, transforming it into alkaline silicates. The main fluxes used in ancient glass-making were natural sodium minerals (*natron* Na_2O) and vegetable ash (soda-lime from coastal plants, potash-lime from in-land plants K_2O). See also *Natron* and *Soda.*
Frit *Fritta* *Fritte*	This semi-finished crystalline product was obtained by heating the *batch* for several hours in the reverberatory oven in order to calcine, i.e. at temperatures below the melting point (700- 800°C). After cooling, the frit and other materials (colourants, *cullet*) were placed in pots and melted in the *melting furnace*. The aim of this preliminary procedure was to make the *silica* react with the *fluxes,* transforming it into alkaline silicates, which have lower melting temperatures. In addition, the carbon dioxide formed through the decomposition of the carbonates was eliminated, thus making refining easier in the later melting stage. When vegetable ash was used, calcination helped to complete the combustion of the carbonaceous residues, which otherwise would have interfered with the colouring of the glass. The term 'fritta' first appears in Murano documents in the fifteenth century. After industrialisation, the process was no longer used, since melting furnaces could reach much higher temperatures. The extent to which Byzantine glass makers used a specific fritting stage is still unclear, as there is little archaeological evidence for a partially crystalline frit material. It may be that because the glass *batch* was heated very slowly in large wood-fired furnaces, the benefits outlined above were achieved without the need to transfer the frit between furnaces.
Glass *Vetro* *Verre*	Inorganic material obtained by the melting of a vitrifiable mixture to form a viscous plastic fused substance, which solidifies on cooling without crystallising (a non-crystaline solid). Glass may be transparent, translucent, opalescent or opaque, colourless or coloured. It can be shaped when hot using various techniques such as blowing, moulding, pressing or casting.

English/Italian/French	Explanation
Glass former *Vetrificante* *Agent vitrifiant*	Ingredients in the glass mixture or *batch*. The main glass former is *silica* SiO_2. This forms the glass network, whereas the *fluxes* and *stabilisers* occupy the hollow spaces in the network.
Glass paste *Pasta vitrea* *Pâte de verre*	Related to *mosaic*, this term indicates *coloured opaque tesserae* produced with traditional, almost lead-free, glass.
Glass rod *Canna* *Baguette de verre*	A solid opaque monochrome or layered polychrome glass stick of varying diameter. It is made by drawing out a heated glass mass on the tips of two iron tools.
Interstice and joint *Interstizio or fuga* *Interstice*	Interstice is the empty space between tesserae, which has been left deliberately free of mortar, whereas 'joint' is used to describe the space between tesserae when filled with mortar. Of the Italian terms ‘fuga’ is used most frequently and is used for both ’interstice’ and ‘joint’. Likewise in French, interstice is used for both terms.
Lattimo	White opaque glass. See *Colour*.
Lead glass *Vetro al piombo* *Verre au plomb*	Glass with a high percentage of lead oxide (PbO from 5-60%). In ancient Western glass-making, lead was only related to some opaque colours (yellow, orange, red and occasionally white and turquoise). It was used together with antimony or tin to make *coloured opaque glass.* Lead glass was made in China from the late first millennium BCE. In Medieval Europe and the Islamic world, lead-rich transparent glasses from the medieval period have been found, but are not common. After the Renaissance, lead was deliberately added to make a particularly brilliant glass easy to cut compared to traditional glass slabs (lead glass is softer).

English/Italian/French	Explanation
Marver *Bronzino* *Marbre*	Smooth metal surface (once a stone slab) onto which the glass is poured to prepare the mosaic slabs; it is also used to roll the gather of fused glass before blowing.
Melting *Fusione* *Fusion*	The transformation of the mixture (*batch*) or *frit* in pots or tanks (See *Melting furnace*) into glass. The process takes place at high temperatures (around 1000-1200°C in ancient times and over 1400°C in modern furnaces). During this process the solid compounds dissolve completely (homogenisation) and the gases present as bubbles are eliminated (fining). Given the limited technological means in ancient glass-making, melting often lasted several days until a workable glass (i.e. sufficiently homogeneous and refined) could be obtained.
Melting furnace *Forno fusorio* *Four de fusion*	In medieval and later Italy, the melting furnace consisted of a bench, a shelf for the various pots over the fireplace, and a cubicle where the firewood was stored. The air for combustion entered through the same opening used for loading the wood, while the waste gases were exhausted through a hole in the furnace vault and a central hole in the bench thus allowing the gas heat to reach the pots. The *annealing* of glass objects took place on the shelf, the so-called 'ara', above the bench. The glassmaker carried out various tasks (placing the batch, gathering the fused glass, etc.) through one or several arched openings (‘mouths’) closed by small doors made of refractory clay. In modern methane- or oil-fired furnaces the flames move round the pots and the temperatures are higher (around 1400°C) making the two-stage melting involving the *frit* unnecessary. There is widespread evidence to suggest that in parts of the Byzantine world, pots were used less frequently and glass was melted in large rectangular clay-lined tanks (Israel: Apollonia and Bet’ Eliezer (7-8C); Lebanon: Tyre (9C); Somelaria (12C)).

English/Italian/French	Explanation
Metal leaf (silver or gold) *Foglia metallica (d'oro o d'argento)* *Feuille de métal (argent ou or)*	A thin sheet of metal obtained by beating. The thinnest is gold (20gr, c.1cm^3, yields c. 6m^2), silver is less malleable (it takes 100gr to make c. 6m^2 of silver leaf). Metal leaf *tesserae* are made up of a glass support layer less than 1cm thick (usually transparent, at times opaque red or another colour). The metal leaf is then sandwiched between the support and a thin protective glass layer (the *cartellina*). In *tesserae*, the colour shade is determined by the purity of the metal, the thickness of the leaf, the colour of the cartellina, and of the support.
Micromosaic *Micro mosaico* *Micro mosaïque*	Describes mosaic compositions made with tiny *tesserae*, which can be as small as 1mm wide. The tesserae are cut from thin rods of glass.
Molten glass *Vetro fuso* *Verre en fusion*	Glass in the liquid state at high temperatures (over 1000°C) after the *melting* of all the constituent ingredients. The molten glass is slowly cooled to a temperature called the working temperature (900°-1000°C), when it becomes plastic and malleable.
Mortar *Malta* *Mortier*	A mixture of binder, aggregate and water, which will set and harden fixing the tesserae to the wall.
Mosaic *Mosaico* *Mosaïque*	The decoration of a surface with small juxtaposed fragments (*tesserae*) usually of glass paste, *metal foil* glass *tesserae*, enamel, stone, or terracotta arranged according to a design (‘sinopia’) traced on a specially prepared plaster base. The earliest glass paste wall mosaics date back to around the beginning of the second century BC.
Natron	The term used in archaeology to describe a natural mineral deposit made up of various sodium salts (carbonate (Na_2CO_3), bicarbonate ($NaHCO_3$)), chloride (NaCl), and sulphate (Na_2SO_4) used as a *flux*. It was mainly extracted in Egypt (notably from Wadi Natrun) in deposits formed by the evaporation of water from the river Nile. It should not be confused with the strictly mineralogical name ‘natron’, which refers to a specific mineral ($Na_2CO_3.10H_2O$.)
Opacifiers	Agents added to the *batch* or fused glass to make the

English/Italian/French	Explanation
Opacizzanti *Opacifiants*	glass lose its transparency. The quantity and nature of the opacifiers made it possible to obtain grades of translucent, opalescent or completely opaque glass. At various times, the most common opacifiers were antimony (Sb_2O_3. Through the separation of white sodium or calcium antimonate - $_{Ca2Sb2O7}$ or $CaSb_2O_6$)); yellow lead antimonate ($Pb_2Sb_2O_7$. Micro-crystals added while the fused glass was cooling); tin (white tin oxide SnO_2 or yellow lead stannate Pb_2SnO_4 or $PbSnO_3$); phosphorus found in bone ash and used to make translucent (opal) glass; and crushed quartz (*silica* sand) added to the *molten glass*, which then remained undissolved in the glass. Opal glass could be produced by creating a large number of gas bubbles through the addition of sulphates and chlorides to the fused glass. Previously transparent glass may appear opaque, because of surface decay and the formation of salt deposits and encrustations (see *Weathering*).
Oxidation *Ossidazione* *Oxydation*	The transformation of a metal into an oxide or, in the case of elements with several valences, the increase from a lower valence to a higher one. In glass-making the oxidation state of iron (ferrous FeO or ferric Fe_2O_3), manganese, and copper are important. These elements will *colour* the glass differently depending on their state of oxidation. Oxidation is sometimes misleadingly used to refer to glass decay (see *Weathering*).
Oxide *Ossido* *Oxyde*	All of the constituent elements of glass (silicon, sodium and calcium, etc.) are found in their oxide form in the glass structure, i.e. bound to oxygen atoms. Therefore the glass composition is expressed as wt% of the oxides.
Pigments *Pigmenti* *Pigments*	See *Colour (opaque glass*).

English/Italian/French	Explanation
Potash glass *Vetro potassico* *Verre potassique*	Glass made by using plant ash as a *flux*. This ash contains potash mixed with other salts such as calcium carbonate, phosphates, etc., plus calcined tartar and potassium nitrate. Potash glass is usually more brilliant than soda glass, but is less durable.
Raw glass *Vetro grezzo* *Verre brut*	Raw glass is the term given to glass in its unworked state, the material produced from the glass furnace, before it is manufactured into glass objects.
Raw materials *Materie prime* *Matières premières*	See *Batch.*
Recycling (Re-melting) *Riciclaggio* *Recyclage (Refusion)*	The re-melting of old glass.
Re-use *Reimpiego* *Réemploi*	The re-use of *tesserae* in *mosaics* without re-melting.
Refractory *Refrattario* *Réfractaire*	Clay based material mixed with *silica* (soapstone was also used in the Roman period) able to resist heat and the contact with fused glass without deforming or corroding to any great extent. Such material was used to make the *melting furnace* and pots.
Reduction *Riduzione* *Réduction*	The opposite of *Oxidation*: decrease from a higher to a lower valence. For example, a metal ore (oxidized metal) is reduced to the respective metal in its elemental form (non-oxidized).

English/Italian/French	Explanation
Reverberatory oven *Calchera* *Four à réverbère*	This oven is especially designed so that heat from the fire on the floor is reflected in the ceiling. Historically it was used to prepare the *frit* by calcining the glass *batch* at 700 - 800°C or calcining some of the raw materials.
Silica (SiO_2) *Silice* *Silice*	The main ingredient for glass, which plays the role of the *glass former.* In ancient glass, silica was added to the mixture either in the form of impure natural sand or as finely ground quartz pebbles.
Slab *Piastra musiva (pizza)* *Plaque*	Coloured glass disc (cake) or strip from which the tesserae are cut. The strip is also called 'lingua' (tongue) and is commonly used when making metal foil slabs obtained by pouring the *molten glass* onto a flat surface. After *annealing*, the *tesserae* are obtained by *cutting* the slabs.
Smalto (pl. *Smalti*)	In the world of mosaics, smalto indicates a particularly brilliant, opaque, high lead coloured glass usually prepared by adding crystalline material (*corpo*) and coloured crystals (*anima*) to a transparent *molten glass*. Smalti come in a vast range of shades (several thousands) with obvious advantages over the few dozen hues of glass pastes. The term smalto is sometimes incorrectly used to describe *metal leaf mosaic tesserae*. Since the eighteenth century in English and French usage, the term 'smalt' has been used to refer specifically to cobalt-coloured glass used as a pigment in painting or in ceramic decoration or as a pigment to be added to colourless glass.
Soda *Soda* *Soude*	Sodium carbonate (Na_2CO_3). An important *flux* added to the *batch* to lower the melting temperature of *silica.* It is found as a natural mineral (*Natron*) and in the ash of a number of plants (for example *Salsola Kali*), which grow in coastal areas and in saline soils. Today soda is prepared synthetically using industrial methods such as the Leblanc and Solvay process based on sodium chloride.

English/Italian/French	Explanation
Soda glass *Vetro sodico* *Verre sodique*	Glass obtained using *soda* as a *flux.* Ancient soda glass is more resistant to attack from the environment and less liable to corrosion or surface decay than ancient potash glass. It contains from 5-10% calcium oxide (*stabiliser*) and is also known as 'soda lime glass'.
Stabilisers *Stabilizzanti* *Agents stabilisants*	These compounds ($CaCO_3$, $MgCO_3$, $BaCO_3$, PbO) are added to the *batch* along with the *glass former* and *fluxes.* Their function is to consolidate the glass structure weakened by the presence of *fluxes*, and thus make the glass resistant to the atmospheric agents, particularly moisture. Ancient glass-makers do not seem to have been aware of the effects of these components. They must have been unintentionally introduced to the batch either through the glass former (river or sea sands containing calcium carbonate) or through plant ash used as *fluxes.*
Support *Sopporto* *Support*	See *Metal leaf*, *Weathering.*
Translucent *Traslucido* *Translucide*	Clear, slightly opacified, glass, which diffuses light so that objects beyond cannot be seen clearly. In *mosaic tesserae*, this effect was created by bubbles, quartz grains, calcium phosphate (bone ash) etc. The term 'translucent' is also used to describe very dark coloured transparent glass.
Tessera (pl. *Tesserae*) *Tessera* (pl. *Tessere*) *Tesselle* (pl. *Tesselles*)	Small, usually square, pieces of glass or other material used to make a *mosaic.* Their sizes generally range from a few mm to 20mm long/wide and 5-10mm thick. The term derives from the Greek word meaning 'four sided'. When glass was first used for mosaic tesserae is uncertain, but systematic use dates to the first century AD. See also *Cutting*.

English/Italian/French	Explanation
Vegetable ash *Ceneri vegetali* *Cendres de plantes*	Material with a complex composition obtained by the slow combustion of various kinds of plants. Vegetable ash was one of the main sources of alkalis (*fluxes*) in Antiquity. Depending on the kind of plants, used the composition could be mainly soda carbonate (Na_2CO_3) or potassium carbonate (K_2CO_3) or a mixture of the two (mixed ash). These ashes also contained calcium and magnesium carbonates (stabilisers), phosphates, chlorides, sulphates and iron impurities (colorants). Up to the Middle Ages, the ash used was predominantly soda ash. It was prepared by burning plants found on the Mediterranean coasts and in the desert areas of the Middle East and Egypt. In later centuries soda ash was also made from seaweed and potash from continental plants (birch, oak and fern).
Weathering *Alterazione* *Altération*	Weathering is the process of physical and/or chemical interaction of any material with the atmosphere. Ancient glass *mosaic tesserae* may have changed colour because of surface decay or have weakened colours because of the formation of whitish weathered glass layers or salt deposits. A weathered glass layer is often fragile and tends to flake off. Decay leads initially to iridescence on the surface, then to whitening, and ultimately to a complete disintegration. In some cases, the *tesserae* are so weathered that they become brittle (marked by micro-fractures). Metal foil *tesserae* can suffer from a particular kind of weathering whereby the *tessera* loses the *cartellina* and the *metallic leaf*, leaving only the support base in place. Weathering is often found in *tesserae* made of less durable glass or in glass *tesserae* conserved in aggressive environments (high humidity, pollution, cyclical phenomena of condensation, etc.).

If you wish to quote from the glossary, please use the following reference: Verità, M., James, L., Freestone, I., Henderson, J., Nenna, M.-D., and Schibille, N., *Glossary of Mosaic Glass Terms*, ed by B. Bjornholt (Centre for Byzantine Cultural History, University of Sussex, 2009) and insert the URL. For a glossary in Italian see *I colori della luce. Angelo Orsoni e l'arte del mosaico,* Moldi-Ravenna, C. (ed.), (Marsilio, Venezia, 1996) or Farneti, M., *Glossario Tecnico-storico del mosaico-Technicalhistorical glossary of mosaic art* (Ravenna, 1993).