Corundum with residues from the heating process present in healed fissures and/or cavities

Members of the Laboratory Manual Harmonisation Committee (LMHC) have standardised the nomenclature that they use to describe heat treatment in corundum and the degree to which fissure “healing” has occurred, and the residues that remain within the healed fissures and cavities, following the heating of corundum.

Healed fissures:

Any corundum that shows indications of having undergone heat treatment and a degree of healing along (previous) fractures - see Figure 1 - which also contain a residue(s) from the heating process, shall be described as ‘natural corundum’, ‘ruby or sapphire’ ‘indications of heating’ (to modify the colour and/or transparency of the stone), plus the appropriate residue quantification terminology – alphanumeric and/or text description1. See table 1 and examples in figures 2, 3 and 4.

Note 1: As an option, e.g., for “simplified reporting” situations, the quantification of residues in healed fissures may be replaced by the statement ‘residues in healed fissures’.

Note 2: Wording in parenthesis is optional.

Note 3: This clause may include the presence of small filled cavities.

A. before heat treatment

B. during heating process

C. after cooling

D. after possible devitrification

E. after cleaning by surface-etching

Figure 1: Flux assisted healing of a fracture during the heating process. A fracture that has been healed by the synthesis of Corundum or other materials during the heat treatment or crystal growth processes. (Hänni, H.A., 1998) (a) schematic (b) actual

Table 1: Residue quantification terminology

<table>
<thead>
<tr>
<th>Condition →</th>
<th>No indications of heating</th>
<th>Indications of heating (no residue)</th>
<th>Indications of heating with residues in fissures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Report Alpha numeric →</td>
<td>NTE</td>
<td>TE</td>
<td>TE1</td>
</tr>
<tr>
<td>Report Text</td>
<td>No indications of heating</td>
<td>Indications of heating</td>
<td>Minor residue in fissures</td>
</tr>
<tr>
<td>Condition →</td>
<td>Indications of heating with residues in cavities</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Report Alpha numeric →</td>
<td>C1</td>
<td>C2</td>
<td>C3</td>
</tr>
<tr>
<td>Report Text</td>
<td>Minor Residue in cavities</td>
<td>Moderate Residue in cavities</td>
<td>Significant Residue in cavities</td>
</tr>
</tbody>
</table>

Members of the LMHC determine which of the residue quantification terminology to use (see table 1) taking into account the size and position of each healed feather and the nature of the residue that remains. This residue may be comprised of

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1 In the cases of TE1 and TE2 (minor) or TE3 and TE4 (moderate), when the text version is selected a reference to the specific alpha-numeric shall be indicated either by combining the two or placing an « x » in the appropriate point of the comparative scale.
structures ranging from a fine bubble-like network with very little ‘thickness’ to numerous lake-like structures that may have a considerable thickness (see examples in figures 2, 3 and 4).

Figure 2: Minor residue (TE1) in this example consisting of fine bubble-like structures

Figure 3: Moderate residue (TE3) in this example consisting of coarse bubble-like structures and films

Figure 4: Significant residue (TE5) in this example consisting of coarse and thick film-like structures

Figure 5: Significant residue (TE5) in this example consisting of coarse and thick film-like structures together with a large glass-filled cavity (C3) (example image left)

Filled cavities:

Any corundum that shows indications of having undergone heat treatment and the presence of a vitreous residue in a cavity(ies), shall be described as « species » 'natural corundum', « variety » 'ruby' or 'sapphire' «comments» 'indications of heating', plus the appropriate quantification terminology - alpha numeric and/or text description. Table1 outlines the use of the designated alpha numeric or text descriptions and figure 5 gives an example of a typical situation.

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