**Summer 2025**
Published: 01 July
www.LustreGemmology.com/research

Gemmology Bulletin

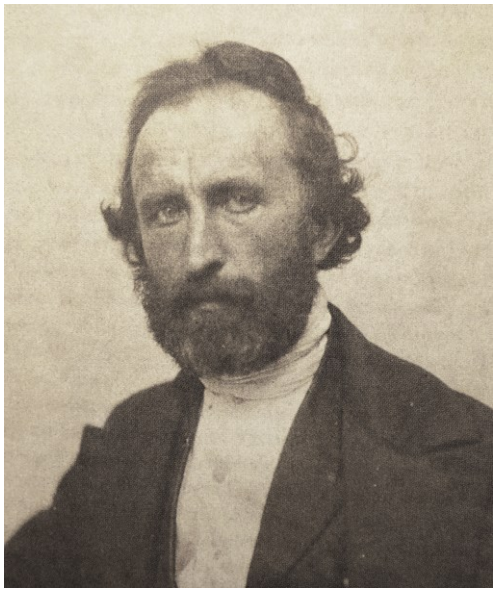


# Rediscovering Manufactured Ruby: Part II

**By James Evans, EG**

In Part I of this bulletin we replicated the first fusion of ruby, as well as the first crystallisation of colourless corundum from powdered alumina (both of which were achieved by Antoine Lavoisier in 1782).

For Part II, we turn to the next significant step in the history of manufactured ruby. In 1834, Marc Antoine Augustin Gaudin crystallised ruby from ammonium aluminium sulphate (i.e. ammonium alum) plus 0.4-0.5 percent of potassium chromate (from which the chromium would impart colour to the ruby).



**Portrait of Marc Gaudin.**

Gaudin's process was to first line a crucible with black smoke (i.e. carbon) – to prevent the crucible from reacting with its contents. He then added the alum and potassium chromate, and subjected the mixture to the heat of an oxyhydrogen blow-pipe. The potassium chromate would dissolve in sulphuric acid (which was released from the alum) to form a bright yellow solution. As the mixture was further decomposed and volatised, only the aluminium and chromium oxides would remain. These oxides would then melt under the extreme heat of the blow-pipe. As they cooled, they crystallised to form corundum – becoming first green and then the characteristic carmine red of ruby.

Gaudin's rubies, however, were only slightly translucent. Auguste Verneuil would later attribute this deficiency to Gaudin using too hot a flame (we've therefore used a fuel mixture of propylene and propane, which burns around 300°C cooler than hydrogen).

## Stage 1 – volatising the additional elements

Gemmology Bulletin



## Stage 2 – crystallising the aluminium and chromium oxides

Gemmology Bulletin



## Stage 3 – cooling the ruby crystals

Gemmology Bulletin



## The final product