

A COMBINED FORENSIC APPROACH TO DISCRIMINATING DIAMONDS

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Diamonds are widely known as a conflict mineral (“blood diamonds”), used to fund wars by rebel groups against legitimate and internationally recognised governments, since 2000. In order to halt the flow of conflict diamonds, South Africa initiated the Kimberley Process Certification Scheme (KPCS). This is a joint government, industry and civil society initiative which sets out requirements for controlling rough diamond production and trade, in order to ensure diamonds are conflict-free.

In addition to monitoring the trade characteristics of different countries, a number of different laboratories have undertaken studies to ascertain if diamonds can be “fingerprinted” – i.e., if diamonds can be discriminated by source – which would enable tracing of possible conflict diamonds, and in doing so, possibly prevent the further trade of such diamonds. These studies have been undertaken from both an academic as well as forensic perspective, whereby those involved in academic studies use the results, which need to be as *accurate* as possible, to have a greater understanding of the diamond and mantle genesis (e.g., Resano et al. 2003; Rege et al. 2005, 2010; McNeill et al. 2009). In terms of forensic studies, more emphasis has been put on the *repeatability* of results, and to use them purely for source discrimination (e.g., Dalpé et al. 2010). Additionally, the methods used by forensic scientists need to be of sufficient simplicity and consistency to ensure wide implementation by different institutions.

In 2008-2009, the Mintek Mineralogy Division established a Provenance Laboratory, in conjunction with the South African Diamond and Precious Metals Regulator (SADPMR). The Laboratory has been specifically set-up in order to ascertain if a combination of both physical (morphology) and chemical characteristics (nitrogen contents and aggregation states, trace element contents) can be used to discriminate diamonds forensically. The Laboratory operates under the auspices of the KPCS, and is creating a database of diamonds from different African locations, as well as investigating whether “forensic fingerprinting” is feasible or not. Initial results indicate that diamonds can be discriminated, and the forensic applicability of the data will be discussed.

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