

## **GREEN DIAMONDS OF NATURAL AND TREATED COLOUR**

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Fancy-colour diamonds occur in numerous hues. Green colour is induced by high energy irradiation. Common to all types and to natural and artificial irradiation are point defects, a crystal lattice damage termed GR1-8. Carbon atoms are expelled from original lattice sites, leaving behind neutral vacancies which absorb visible light in the red region. GR1 is the strongest of these colour centres. Natural green diamond crystals owe their shallow skin colour to alpha-irradiation by radioactive fluids and body colour to gamma (and possibly beta) irradiation by adjacent U, Th and 40K minerals. Diamonds are colour-treated after cutting. Modern cutting not only removes skin but reduces body colours (because temperatures above 550C rapidly destroy GR1-8, 3H, and 667nm absorptions) and generates an unknown number of pseudo-natural annealing effects like formerly absent H3, 594 and 637nm absorptions. These unpredictable thermal artefacts endanger the correct identification of natural and treated green colour origins. In many instances, faceted treated green diamonds cannot be separated from natural green ones. The identification problem can only be solved by analysing an important number of the rare natural green body-colour diamond rough and to record their absorption behaviour at each stage of temperature-controlled cutting. Geologists could substantially support the research project by loaning provably untreated specimens from their mines.