

## *Spectroscopic characterization of dental materials*

**Michele Di Foggia**

*(Dipartimento di Scienze Biomediche e Neuromotorie, Università di Bologna)*

### **SPECTROSCOPIC CHARACTERIZATION OF DENTAL MATERIALS**

*Michele Di Foggia,<sup>1</sup> Fausto Zamparini,<sup>2</sup> Carlo Prati,<sup>2</sup> Maria Giovanna Gandolfi,<sup>3</sup> Paola Taddei<sup>1</sup>*

<sup>1</sup>Biochemistry Unit, Department of Biomedical and Neuromotor Sciences, University of Bologna

<sup>2</sup>Endodontic Clinical Section, Unit of Odontostomatological Sciences, Department of Biomedical and Neuromotor Sciences, University of Bologna

<sup>3</sup>Laboratory of Biomaterials and Oral Pathology, Unit of Odontostomatological Sciences, Department of Biomedical and Neuromotor Sciences, University of Bologna

The application of artificial materials in dentistry is as old as human civilization (the first reported use of a dental filler dates back to 6500 years ago); since then, a wide range of dental materials (ceramic, metallic, polymeric, and composite) have been proposed to restore or replace tooth structures. Applying these materials to the oral cavity requires demanding physicochemical and biological properties, such as biocompatibility, physical and chemical resistance to the oral environment, stability of mechanical properties, and appropriate aesthetics [1].

In this context, vibrational spectroscopic techniques (IR and Raman) can be successfully used to characterize at a molecular level most dental materials to gain insights into their chemical composition, bioactivity, and interaction with teeth structure.

In particular, we present a selection of studies made in collaboration between the Laboratory of IR and Raman spectroscopy and the Unit of Odontostomatological Science of the Department of Biomedical and Neuromotor Sciences (DIBINEM) of the University of Bologna. The presentation will focus on the following:

- New pre-mixed calcium Silicate-bioceramic root canal sealers [2];
- Polydimethylsiloxane-based root canal sealers [3];
- Calcium hydroxide-releasing materials for pulp capping [4];
- Dentin remineralization [5].

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