

## CHANGES IN MOLECULAR STRUCTURE OF PLASMA POLYMERIZED FILMS FROM 2-METHYL-2-OXAZOLINE AFTER INCORPORATION OF CHLORHEXIDINE

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### 1. Introduction

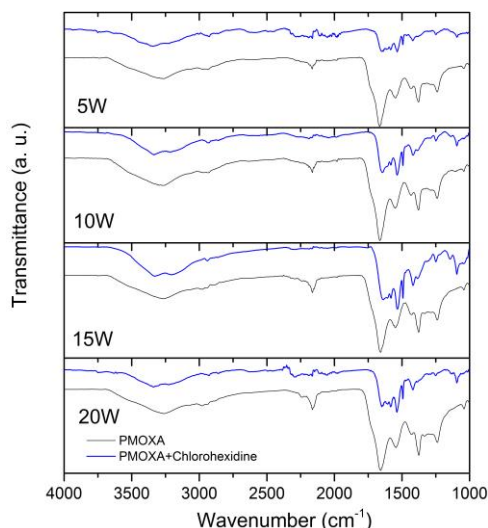
Poly-oxazolines are known for their biocompatible properties, they are protein-resistant, hydrophilic and have “stealth” properties [1,2]. They are usually obtained by ring-opening polymerization, however, new techniques are being used for it, such as plasma polymerization [3,4]. The plasma polymerization occurs when an organic vapor, or monomer, is broken to radicals in the plasma mean, these radicals may recombine with each other and/or deposited in any surface in contact with such plasma, growing a film on it. As the recombination of the radicals occurs randomly, the film structure becomes homogeneous and crosslinked, differing from the regular polymers. The chlorhexidine is an antiseptic largely used in odontology, it is bactericide and antifungal. The incorporation of this kind of medicine in a polymeric thin coating might be interesting for infection control in in-vivo implants.

### 2. Experimental Setup

In this work, the monomer 2-methyl-2-oxazoline was used as film precursor and aluminum foil as substrate. The polymerization occurs inside a circular plain stainless steel parallel plates reactor, the upper electrode was fed by a radiofrequency (RF) power supply, and the bottom one was grounded. The chamber was evacuated to the pressure of  $10^{-2}$  Torr, so the monomer was admitted into the chamber until the pressure of 40 mTorr, then the argon filled it until it reached 80 mTorr. The applied RF power varied from 5 to 20 W, the deposition time was 60 minutes. The infrared spectra of the samples were measured, then the samples were placed in a 2% chlorhexidine bath for 30 minutes and dried for 2 days after that. The infrared spectra were then measured again.

### 3. Results and Discussions

The infrared spectra are shows in Fig.1, the incorporation of chlorhexidine promoted changes in functional groups related to it, those changes were observed in the infrared spectra, essentially in C-C (1450-1512  $\text{cm}^{-1}$ ), C=N (1600-1670  $\text{cm}^{-1}$ ) and phenyl group (1550  $\text{cm}^{-1}$ ).



**Fig. 1.** Infrared spectra of the plasma polymerized 2-methyl-2-oxazoline before and after the chlorhexidine incorporation

### 4. References (bold face Times New Roman 11 pt)

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