$$([\bar{K}]-\omega^2[\bar{M}])[U]=[\bar{P}]V$$
$$[\bar{P}]'[U]+C_0V=Q \quad (5)$$

In freedom condition, we have the dynamic equation as follows

$$([\bar{K}]-\omega^2[\bar{M}])[U]=0 \quad (6)$$

Where $[\bar{K}]$ is the stiffness matrix and $[\bar{M}]$ the mass matrix.

The empty ellipse hydrophone owns a very low resonance frequency so we fill it full of Silica in order to enhance its first resonance frequency. The first resonance frequency of hydrophone full of Silica is 14946HZ.

D. Experiment Results

Measuring system was established with M-Z interferometer for pressure sensitivity. By experiment, the pressure sensitivity after packaging is 40dB larger than before packaging for the cylindial shape encapsulation structure. The comparison on phase sensitivity to acoustic pressure between after packaging and before packaging is shown in figure 8.

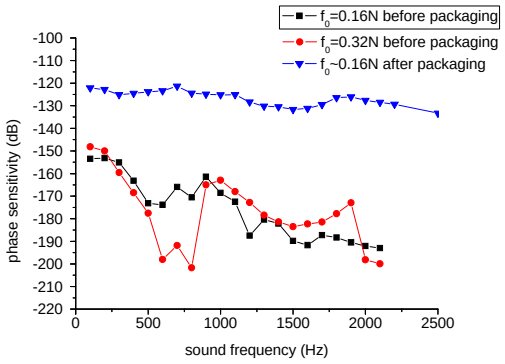

Figure 8 Comparison of phase sensitivity between the packaging hydrophone and the bare FBG

Meanwhile, the hydrophone of splindial shape encapsulation structure was compared with the cylinder one.

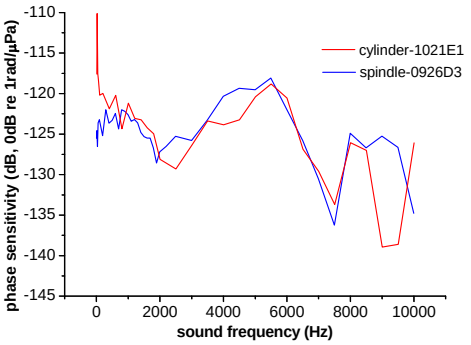

Figure 9 Comparison of phase sensitivity between the Spindle Encapsulation Structure and the Cylinder

The testing results indicate that the hydrophone of splindle is 3dB higher than the cylinder one.

III. Conclusion

In this paper, ANSYS was used to simulate the encapsulation structure of hydrophone in order to enhance its acoustic pressure sensitivity. Polyurethane was adopted to package the hydrophone and two hydrophones were made with one cylinder shape and the other splindle shape. The experiment shows that after packaging, the acoustic pressure sensitivity was higer than before packaging. In the future, new structure of polyurethane will be designed to furture enhance the acoustic pressure sensitivity.

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