



Dielectric properties of carbon microcoils (CMCs)/polysilicone composite sheets



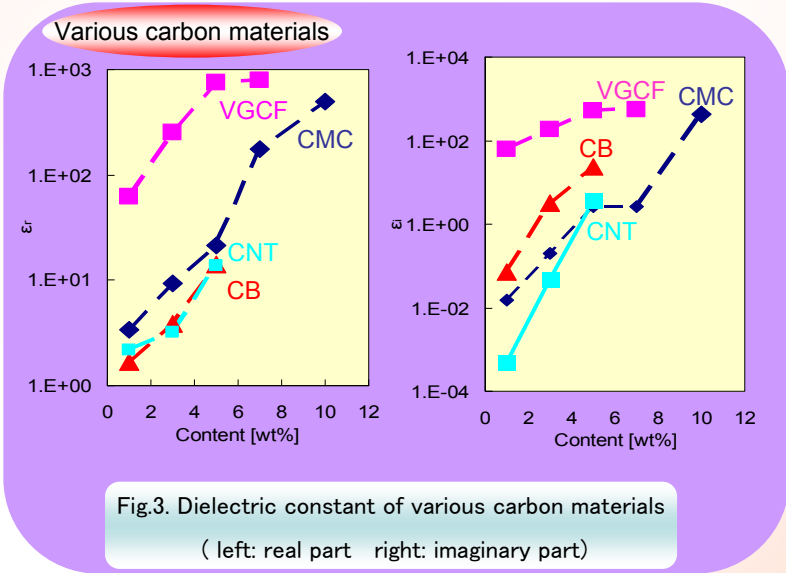
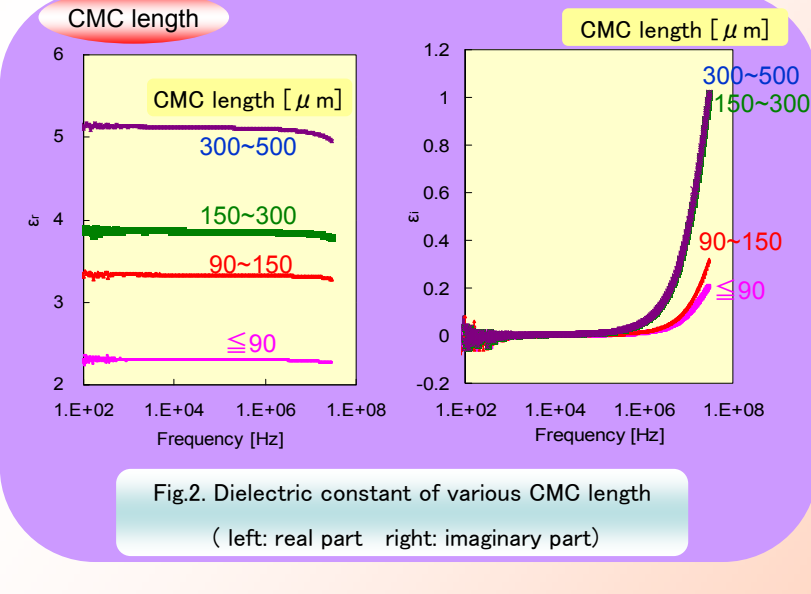
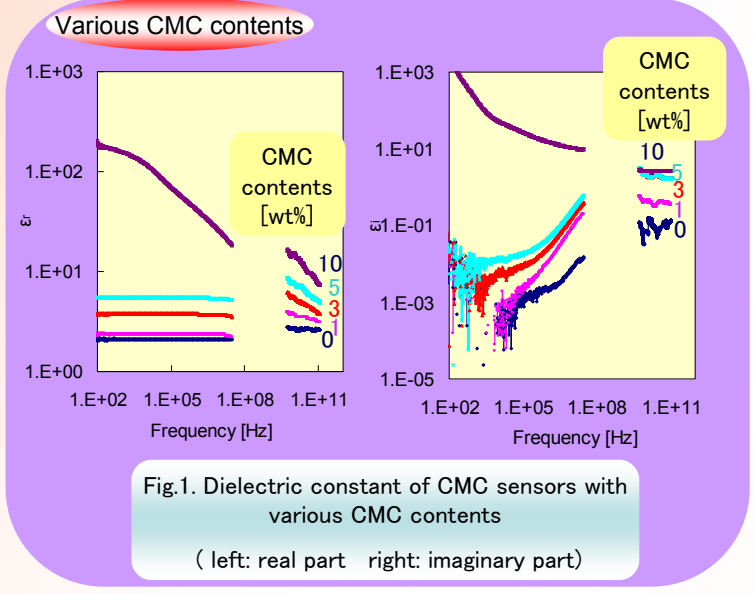
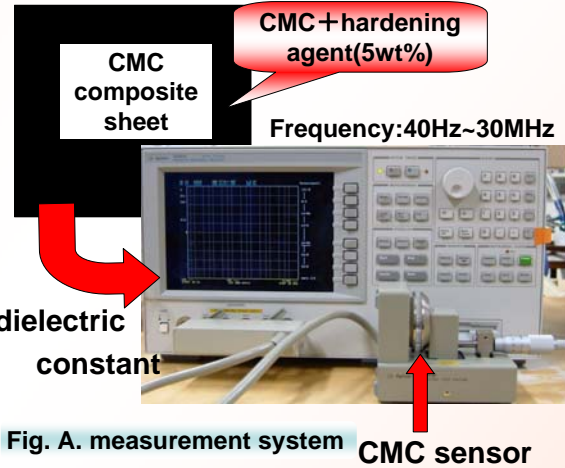
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Carbon microcoils (CMCs) have the function of tactile sensing and electromagnetic wave absorption due to their specific structure. Actually, CMCs/polymer composites have excellent characteristics that can be applied to various fields. Usually, composites have different conditions such as shape, size, thickness and CMC contents, as a result, the dielectric properties change as the composite conditions change. Therefore, it is needed to examine dielectric constant to carry the material design. In this work, we examine the dependence of dielectric constant on frequency as a function of CMC contents and CMC length in the composites.

Carbon materials

Table 1. Various properties for carbon materials

	CMCs (carbon microcoil)	VGCFs (vapor grown carbon fiber)	CB (carbon black)	CNTs (carbon nanotube)
Fiber diameter (coil diameter) [μm]	0.1~1 (1~10)	0.15	5~10 (particle size)	0.002~0.003
Length [μm]	90~1000	10~20		0.01~1
Electric conductivity [S/cm]	01~50	80	—	—
Density[g/cm ³]	1.88	2.0	1.8	—
Company	CMC Technology Development Co., Ltd	Showa Denko Co., Ltd	SIGMA-ALDRICH Japan K.K.	CMC Technology Development Co., Ltd



Conclusions

- It is found that with the increase in CMC contents and CMC length, the dielectric constant increased.
- Dielectric constant
 VGCF>CMC>CNT>CB (Real part)
 VGCF>CB>CMC>CNT (Imaginary part)