

MICROWAVE PROPAGATION THROUGH THE  
SUPERCONDUCTOR-INSULATOR COMPOSITES

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We report on microwave and low frequency properties of composites consisting of YBaCuO grains embedded in a polymer matrix with a strong emphasis on the microwave transmission experiment. The low-frequency conductivity vs the YBaCuO grain volume fraction,  $f$ , can be described by a 3-D percolation model with a percolation threshold of  $f = 0.2$ . The microwave phase velocity and the transmission coefficient are significantly large in the superconducting state of the grains compared to their normal state values. These parameters are sensitive to the external magnetic field in the superconducting state. The increase of the phase velocity in the superconducting state is attributed to the change of the effective magnetic permeability which is in conflict with previous theoretical prediction.