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Acoustic response of a sonic-like crystal within a rigid frame porous plate

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The acoustic response (in particular, the transmission) of a periodic distribution of macroscopic inclusions within a rigid frame, porous plate (similar to a sonic crystal) is studied by the multipole method. Numerical results show that the addition of grating stacks leads to band-gaps within the audible frequency range for a small number of stacks, this being associated with a large decrease of the transmission coefficient of the initial plate. The first band gap is of practical interest for noise suppression. The second band gap enables total acoustic absorption within a narrow frequency range due to the fact that a modified mode of the plate lies within this band gap.