Abstract:Amorphous silicon nitride (Si_3N_4) film has outstanding electret properties and it is compatible to the micromachining technology. Therefore, it is expected to find use as an electret membrane or vibrating membrane in miniature microphones. Both sensitivity and stability are very important parameters in miniature microphones. So high internal stress in Si_3N_4 film should be eliminated. In this paper, the reduction of internal stress due to boron ion implantation for the LPCVD Si_3N_4 film on silicon substrate and the influence of boron ion implantation on the mechanics and electret properties of Si_3N_4 films are discussed. The results show boron ion implantation reduces the internal stress of the Si_3N_4 film effectively and the charge storage of a Si_3N_4 film with implanted B ions is worse than for an unimplanted one. The authors conclude that the Si_3N_4 film is more suitable for use as a vibrating membrane than as a single electret membrane in electret miniature microphones.