Abstract: Amorphous silicon nitride (Si₃N₄) 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 Si₃N₄ film should be eliminated. In this paper, the reduction of internal stress due to boron ion implantation for the LPCVD Si₃N₄ film on silicon substrate and the influence of boron ion implantation on the mechanics and electret properties of Si₃N₄ films are discussed. The results show boron ion implantation reduces the internal stress of the Si₃N₄ film effectively and the charge storage of a Si₃N₄ film with implanted B ions is worse than for an unimplanted one. The authors conclude that the Si₃N₄ film is more suitable for use as a vibrating membrane than as a single electret membrane in electret miniature microphones.