An extruded polypropylene (PP) sheet in which PP molecules and crystalline lamellae orient perpendicular to the flow direction is obtained by addition of a specific nucleating agent, N,N'-dicyclohexyl-2,6-naphthalenedicarboxamide. According to the measurements of dichroic ratio of infrared absorption, Herman's orientation function of crystalline phase is a large negative value whereas that of amorphous phase is close to zero. The sample shows anomalous anisotropy in dynamic tensile modulus, in which the storage modulus in the machine direction (MD) is lower than that in the transversal direction (TD) in the low temperature range and vice versa at high temperature. Moreover, the tensile test reveals that Young's modulus and yield stress in MD direction are larger than those in TD direction at room temperature. These results indicate that PP crystallites are mechanically connected in MD direction. It can be explained by the existence of tie chains in the flow direction. The deformed PP molecules in the flow direction at the extrusion are responsible for a large amount of tie chains in the flow direction.